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### **Ph. D.**

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## Arts

### ECONOMICS

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## EDUCATION

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## ENGLISH

### Ph. D.

- Surendra Dayal Singh, Synge the realist: A Critical Study of his Dramas, begun 1954.
- Goodwin Iqbal David, J. B. Priestley as Dramatist, begun 1954.
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## GEOGRAPHY

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- Sita Ram Bagla, Bombay the Magalopolis of India—A study in urban Geography, begun 1954.
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## HINDI

### D. Litt.

- B. N. Bhatt, Vaishnava Bhakti Kavya aur Bharatiya Sangeet ka paraspar sambandh Adi Kall se Reet-Kaal ke ant tak, begun 1954.
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- R. P. Sharma, Premchandottar Upanyas Sahitya ki Mool Pravittiyon ka Vargikaran aivam vishleshan tatha unke sroton ka Vaigyanik Anusandhan (1937-1957), begun 1958.
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### Ph. D.

- Amba Datta Pant, Apbhramsha Kavya Parampara tatha Vidyapati, begun 1954.
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## SANSKRIT

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## SOCIOLOGY

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## Science

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## CHEMISTRY

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- Ch. Umamaheswara Rao, Industrial Management in India, case studies of A.C.C., National Carbon and Hindustan Lever.

#### **M. Com. (Hons.)**

- K. Balakrishna Rao, Sugar Industry in Andhra Pradesh.  
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#### **ECONOMICS**

##### **M.A. (Hons.)**

- S. Ambirajan, Malthus and Classical Economics.

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- E. Nageswara Rao, Bernard Shaw the Novelist.  
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- O. Ramachandraiya, Phases of Andhra History—Srimukha, the Slayer of Susarma Kanva, A.C.P. Grant of Achyutadevaraya of Vijayanagara.  
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    (1) Political History of Gandikota during the Vijayanagara Period—  
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    (4) Prince Devaraya.  
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## PHILOSOPHY

### A. Lakshmana Rao :

- (1) Philosophy, Philosophers and Philosophical Analysis, published in the Phil. Quar., Jan., '58.
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### D. N. Parthasarathy Rao :

The Problem of Evil.  
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### K. Murty :

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### B. V. Kishan :

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- K. Radha Krishna Murty, The Contemporary Indian Mind.  
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Srimati Ch. Seshamma, The Ramayana and the Sanskrit Dramatists.

## Science

## AGRICULTURE

### M. Sc.

- G. Narasimha Rao, Studies on Maturity and Deterioration of Sugarcane in relation to Lodging.  
M. Lakshmi Kantam, Studies on suerese accumulation in sugarcane with reference to varieties and cultural treatments.  
C. Janaki Devi, A Morphological Study of the varieties of Gogu.  
K. R. Mohan Rao, Some Cocoinllids of the Northern Circars and their importance in the control of insects and mite pests.  
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K. S. R. K. Sankara Rao, Studies on the Effect of Transplantation on the development of Root, Shoot and Yield in Millets of Andhra State.  
B. Narasimham, Studies on the Effect of Fernoxone on Abutilon Indicum G. Don.  
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- A. Suryanarayanamurti, A study of the cost of production of Paddy Virginia Tobacco in East and West Godavary, Krishna and Guntur Districts of Andhra—1954-55.
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- R. S. Venkataramana, Studies on Chemical Composition and Nutrient up-take of Ragi and Inter-relationship of Carbon Nitrogen ratio of soil and up-take of Nutrients.
- R. Narayanamoorti, Propagational Studies on Economic and Ornamental Plants of South India.

## BOTANY

### M. Sc.

- K. V. Sriramakoti, Studies into the organic acid metabolism in *Begonia* and *Billbergia*.
- Kumari K. Krishnakumari, The influence of N, P, and K. treatments on Acid Metabolism of *Hibiscus cannabinus*.
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- V. Ramakrishna Reddi, Cytological Studies in the Genus *Sorghum*.
- M. Srinivasa Rao, Studies in the Floral Morphology of some *portulacaceae*.
- N. V. Subba Rao, Embryological studies in the Genus *Phaseolus*.
- Y. Bhavani Sankaram, Embryology and Anatomy of *Panicum*.
- B. S. M. Dutt, Studies in Floral Morphology of a few *Anaryllidaceae*.
- B. G. Srinivasa Rao, Nutrition Uptake in Plants I-Ammonium and Nitrate and Nutrition and the Organic Acid Metabolism in *Begonia Anamalayana* Bedd.
- Shrimathi N. Sarojini, Embryological studies in the Genus *canna*.
- C. S. R. K. Raju, Cytology and Embryological studies in the Genus *Asparagus*.
- Miss P. Chandravada, The effects of different factor influencing Acid changes in *Vanda* sp.
- P. S. S. V. Subrahmanya Sastry, Plant Organic Acid Metabolism.
- P. Suryanarayana, Plant Growth regulating substances.
- P. V. Bhiravamurthy, Physiology of fruit storage.
- M. J. B. Krishna Rao, Plant Anatomy and Embryology of Angiosperms.
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- N. S. R. Ganapati Raju, Embryological Studies in a few *Rhizophoraceae*.
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- P. Narasimha, Acid Metabolism in Plants.
- K. Ranga Reddy, Anatomical Studies in the Genus *Bauhinia*.
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- T. V. Ramana, Cytological studies in *Euchlaena Mexicana* schrad and coil *Aquatica*. L.
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## CHEMISTRY

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- K. Srivenkateswarlu, Analytical Chemistry of Uranium.  
 N. V. S. Rama Rao, Analytical Chemistry of Thorium.  
 K. Srinivasulu, Analytical Chemistry of the Rare Elements Thorium and Zirconium.  
 G. Sriramulu, Analytical Chemistry of Beryllium.  
 U. Muralikrishna, Studies on the Induced reactions.  
 S. Brahmaji Rao, Induced reactions with Potassium Ferrocyanide.  
 S. Ramagopala Sarma, Studies on the Kinetics of the reaction between Vanadic acid and Hydriodic acid.  
 L. Subbaraya Sarma, Photo-Chemical Analysis.  
 Ch. Bhimasankara Rao, The Analytical application of Thiourea in the Molybdenum blue reaction.  
 V. Brahmayya Sastry, Studies in Zinc content of Biological Materials.  
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 K. V. Jagannadha Rao, Chemical Examination of Tiliacora-racemosa Colebr.  
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 K. Chiranjivi Rao,  
   Chemical Examination of Tectonograndis Linn F. and Synthesis of 2-Methyl 1 -5-Hydroxy.  
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 C. Someswara Rao, Synthetic experiments in Plant colouring matters.  
 Kumari M. Sarada, Studies on the Photoreduction of Phospho-, Silico;- and Arsono Molybdic Acids.  
 P. Lakshmana Rao, Experiments on the Synthesis of Flavans and related compounds.  
 Ch. Ramachandra Rao, Synthesis of some Biologically Active Chromones.  
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 T. Satyagopal, Spot Test Analysis.  
 G. Jagga Rao, Catalysed reactions in Volumetric Analysis.  
 K. Gowrilingam, Volumetric estimation of Sulphydral compounds.  
 S. Seetaramaraju, Fluorescence, Fluorimetric Analysis.  
 B. Appaji Rao, Studies in Molybdenum blue reaction.

- K. Sreeramam, Analytical application of the enhancement of Chemical reactivity by Catalysis and complex formation.
- K. Ramakrishnaiah, Chemistry of Naturally occuring Oxygen Heterocyclic compounds.
- M. V. V. Satyanarayanamurty, Chemistry of Naturally occurring Oxygen Heterocyclic compounds.
- N. V. Ramamohana Rao, Chemistry of Naturally occurring oxygen Heterocyclic compounds.
- Y. Suryanarayanamurti, Isoquinoline Alkaloids.
- V. Lingamurty, Potentiometric Analysis.
- R. V. V. Satyanarayanamurty, Studies in Oxidation methods in Chemical Analysis.
- G. Venkataratnam, Chemistry of rare elements.
- D. Purushottam, Chemistry of rare elements.
- G. V. Subbarayudu, Studies in complex formation in Uranium salts.
- P. V. Krishna Rao, Potentiometric Titration of Vandium III and related systems.
- Smt. A. Savitri, Some Aspects of Vanadometry.
- G. Subrahmanyam, Experiments on the synthesis of furans—chromones related compounds.
- J. C. Bose, Colorimetric estimation of beryllium.
- P. Jayarama Reddi, Rare earths—Studies in Superation.
- V. Gopalakrishna, Analytical Chemistry of Zirconium (Physical Methods).
- U. Ramakrishna Rao, Oscillometric titration of Thorium.
- B. S. Krishna Rao, Analytical Chemistry of Columbium and Tantalum.
- S. V. Suryanarayana, Separation of Uranium and Thorium by Columnar Chromotography.
- T. Suryanarayanamurty, Analytical Chemistry of rare elements—Thorium and Uranium.
- G. S. R. Subba Rao, Experiments in the Synthesis of 3-Methoxy furano (6:7-3:2) Flavone and Alkaloids from the Stern of Tiliacora Racemosa Colebr.
- M. V. R. Koteswara Rao, Synthesis of 8-allyl 7-Hydroxy Isoflavenones and Preliminary Examination of Michelia Champaca Leinn.
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- A. V. Bhavani Sankaram, Synthesis and Study of some Oxygenated Ring Systems and Related Compounds.
- G. Nageswara Rao, Estimation of Ascorbic with diethylene tetra-Ammonium Sulphatocerate and induced reactions in cerate oxidation.
- L. S. A. Dikshitulu, Catalysis in Volumetric Analysis.
- A. Suryanarayanamurty, Reduction of Uranium (VI) by iron (II).
- G. Prabhakara Rao, Studies on the Analytical Chemistry of Molybdenum.

## GEOLOGY

C. Mahadevan,

### 1. Nuclear Geology :

- (i) Geo-chemical dispersion patterns of uranium in soils, waters and plants.
- (ii) Uranium and thorium contents of rocks and their significance.
- (iii) Absolute dating of minerals.

2. Beach studies on Waltair, Visakhapatnam beach :
  - (i) Sand drift along the foreshore and backshore as function of wave height, and length and general wave pattern etc.
  - (ii) Beach profile measurements.
3. Marine Geology of Bay of Bengal :
  - (i) Mapping of the floor of the Bay of Bengal.
  - (ii) Physical constitution and chemical constitution of sea floor and lake bottom sediments in relation to the environments of sedimentation.
  - (iii) Special studies on concretions and clays.
4. Structure Geomorphology and sedimentation in Cuddapah Basin :
  - (i) Mapping of certain areas of major disturbance to decipher the structural disposition of strata.
  - (ii) Study of the nature of upheavels in Cuddapah Basin and their effect on drainage.
  - (iii) Study and interpretation of primary sedimentary structure in the Cuddapah rocks.
  - (iv) Nature of sedimentation during different epochs of the Cuddapah period.
5. Some aspects of Oceanographic Research :
  - (i) Study of different properties such as Mechanical and chemical composition of marine sediments.
  - (ii) Environmental controls on the sedimentation patterns.
6. Petrography petrochemistry of Quartz—magnetite rocks of Ongole area with reference to their structural features :
  - (i) Detailed mapping of the area where these rocks are occurring.
  - (ii) Petrographical study of the rock types.
7. Stratigraphy metamorphism of the Pakhal series of rocks in the Khammametu District :
  - (i) Detailed mapping of the area in the Yellan area.
  - (ii) Petrographical study of the rock types.
8. Copper and lead minaralization in parts of Andhra and Bihar :
  - (i) Ore microscopic and petrographic studies and activity of some ore and rock samples of Mashabani copper ores.

#### A. Narasinga Rao,

1. Studies on Gold Mineralization at Kolar Gold Fields :
  - (i) Ore microscopic studies of Gold and sulphide minerals.
  - (ii) Wallrock alteration and trace element studies.
  - (iii) Petrographic study of basic dyke rocks in the mineralized area.
2. Geology of parts of Guntur and Nellore Districts with special references to (a) metamorphics (b) granites and (c) Cuddapah-archaeal eastern Bombay :
  - (i) Detailed Geological mapping followed by minerological and petrographic study of the chief rock types.



**M. Sc.**

- Sheriff Khaja Mohinuddin, Geology of the Andhra area.
- P. Satyanarayana Rao, Geology of the Kottavalasa area.
- P. Virendra Babu, Geology of Subbavaram area.
- C. Leelanandam, Study of some Indian Radio active Minerals.
- K. V. V. Satyanarayanamurti, Elastic Behaviour of quartzities in relation to structural Petrology.
- M. Subba Rao, Elastic Behaviour of Ganites in relation of structural Petrology.
- A. V. Ramasastry, The study of the distribution of Radio-activity in some of the Archaean Rocks of South India with Special reference to their Retrogenesis.
- Sasibhushanam Panda, Petrogenesis of Nepheline Syenites and the associated Rocks.
- J. Subba Rao, Geology of the coastal strip included in the G.P.S. Sheet No. 65 K/S & 12 with special reference to the black sands concentrates.
- B. Balakrishna Sastry, Seasonal and Tidal influences on the concentration of black sands on the Visakhapatnam beach.
- V. S. Prabhakara Rao, The study of clays and clay minerals of parts of Andhra State.
- V. V. Krishna Rao, Geology of Kanigiri Area.
- C. V. Subrahmanya Sastry, Geology of certain parts of Nellore and Guntur Districts with reference to the study of granitic and the other Associated rocks.
- M. Krishnamurthy, The Geology of Chinakurthy area, Guntur District.
- S. Sethuraghavan, Saline deposits of Pulikat area.
- M. Narayana Rao, Geology of parts of Nellore District with special reference to Gravities.
- T. Ramamohana Rao, Geology of parts of Nellore District with special reference to Gravities.
- M. Ranga Rao, Geology of parts of Nellore District — Sheet No. 57-M/6 Southern half.
- S. Subba Rao, Geology of parts of Guntur District Sheet No. 65-D/2 Southern half.
- C. Bhimeswara Rao, Geology of parts of Nellore District — Sheet No. 57 —M/7, Northern half.
- Srimati A. Sita, Regional Geography of the Low Land Tract of Visakhapatnam.
- B. Edmund Vijayam, Geology of Parts of Kurnool District.
- A. Madhava Rao, The Geology of parts of Guntur Kurnool and Nellore Districts.
- N. Gopala Rao, Geology of some parts of Vinukonda Taluk of Guntur District.
- L. Suryanarayana, Geology of parts of Srikakulam District.
- V. V. S. S. Tilak, Distribution of Radio-activity in the rocks of Andhra Pradesh with special reference to their Petrogenesis.
- K. Venkataratnam, Studies of Ocean floor sediment off Vishakapatnam Coast.
- R. Sarvothama Sheno, Study of the Tertiary and associated formations in parts of East Godavari District.
- K. Padmanabhayya, Geology parts of Srikakulam District.
- V. Narasimhamurthy, Geology parts of Srikakulam District.

- R. Jagadeswara Rao, Geology parts of Srikakulam District.  
 K. V. Subbaramaiah, Geology parts of Nellore District.  
 N. Murty Raju, Geology parts of Nellore District.  
 A. Jagannadham, Geology parts of Nellore District.

### GEOFYSICS

- Dr. V. P. Subrahmanyam,  
 (a) Regional and general classification of the climates of India and vicinity.  
 (b) Study of the climatic water balance of India.  
 (c) Application of (b) to agricultural and hydrological problems.
- Dr. V. P. Subrahmanyam and B. Subba Rao, Hydro-climatic studies of Indian River basins.
- Dr. V. P. Subrahmanyam and B. Padmanabha Murty,  
 (a) Study of moisture balance problems in micro-meteorology with special reference to evaporation.  
 (b) Measurement of Dew in relation to the meteorological factors influencing its information, maintenance and dissipation.  
 (c) Transfer of heat, water vapour and momentum in the lower layers of the atmosphere.
- Prof. R. Ramanadham, A. Alluriah and B. Madhava Reddy, Absorption and fading of radio waves in E and F regions.
- Prof. R. Ramanadham, V. V. R. Varadachary, C. Balarama Murty, J. S. R. Sastry and A. V. S. S. Murty,  
 1. Upwelling and sinking along the east coast.  
 2. Thermal structure of the coastal waters.  
 3. Wave refraction and beach formation.  
 4. Sea surface temperature recording.  
 5. Surface current in the coastal waters.
- Prof. R. Ramanadham, K. Nagamunendra Rao and K. Subba Rao,  
 1. Dropsizes distribution in different types of precipitation.  
 2. Radar echoes of precipitation.  
 3. Condensation nuclei.
- Prof. R. Ramanadham and M. Sankara Rao, Heat, water vapour and momentum transfer in the atmosphere.
- Prof. R. Ramanadham and N. Jaganmohana Rao,  
 1. Electric fields associated with cumulus clouds.  
 2. Thunderstorm electrification.
- Prof. R. Ramanadham and P. Jaganmohan Rao, Application of thermistors for radiation measurement.

### MATHEMATICS

- P. V. Krishniah,  
 (i) On Kakeya's Theorem, pub. in Jour. Lond. Math. Soc. Vol. 30, pp. 314-18.  
 (ii) On the Elementary Symmetry Functions, pub. in Journ. Lond. Math. Soc., Vol. 31, pp. 364-68.
- K. V. Rajeswara Rao, On integers  $\left(a_n^n\right)$  relatively prime to  $f(a_n)$  pub. in Journ. Lond. Math. Soc.

**M.A. (Hons.)**

P. V. Krishniah, Algebra and Theory of numbers.

K. V. Rajeswara Rao, Some problems in Number Theory and Analysis.

**MATHEMATICAL PHYSICS**

Prof. S. Minakshisundaram, Functional Analysis.

Prof. T. Venkatarayudu, Group Theory.

Dr. P. Sambasiva Rao, Fluid Dynamics.

Dr. T. S. G. Krishna Murty, On the Nature of the Force Field in crystals.

D. R. K. Sangameswara Rao, Harmonic integrals.

S. Ramamurty,

Molecular orbital Theory.

Fundamental Particles.

I. V. V. Raghavacharyulu, Group Theory.

V. Vidyaniidhi, Fluid Dynamics.

**MEDICINE****M. Sc.**

P. Simhadri, Histological Study in the innervation of Respiratory Muscles in the Human Foetuses.

G. Ramad Das, Studies in Respiration.

K. R. Pandalai, Studies of the Neurosecretoany cells in the Genus Calote.

**NUCLEAR PHYSICS**

Prof. Swami Jnanananda with V. Lakshminarayana, Interaction of Gamma Rays with matter.

Prof. Swami Jnanananda with P. V. G. Rao, Measurement of  $(n,y)$ — reaction energies.

Prof. Swami Jnanananda with K. V. Reddy, Study of Nuclear Isomerism.

Prof. Swami Jnanananda with A. Srinivasa Rao, Installation of an electrostatic generator with an accelerating column to study neutron scattering cross-sections.

Prof. Swami Jnanananda, V. Lakshminarayana, M. Ramakrishna Raju, D. Lakshmana Sastry, Jayanti Rama Rao, and A. Venkataramayya, Development of Nuclear Spectroscopy (Measurement of alpha, beta and gamma-energies and study of nuclear energy levels).

Prof. Swami Jnanananda with N. C. Biswas, Glass Technologist and rest of the research workers, Glass, Vacuum and Counter Technology.

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V. Lakshminarayana, Interaction of Gamma Radiation with Matter, begun 1955, likely to be completed in 1959.

K. Venkatarreddy, Studies in Nuclear Isomerism, begun 1955, likely to be completed in 1960.

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- J. Rama Rao, Studies in Decay Schemes, begun 1957, likely to be completed in 1960.
- A. Venkataramiah, Studies in Decay Schemes, begun 1958, likely to be completed in 1961.
- K. Narasimhamurthy, Studies in Decay Schemes, begun 1958, likely to be completed in 1961.

## PHARMACEUTICAL CHEMISTRY

- K. Sambamurty,
  1. Crystalline bitter principle of the seeds of the Indian edible sponge gowd, luffa, aegyptiaca, pub. in Ind. J. Pharm. 1954, 16, 225.
  2. Crystalline chemical components of the leaves of Rhododendron falconeri Hook, pub. in Proc. Ind. Acad. Sci., 1957, 46, 245.
 Some reactions of Luffamarin to be pub. in Proc. Ind. Acad. Sci.

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- K. Sambamurty, Chemical Investigation of Indian Medicinal Plants.
- E. Venkata Rao, Chemical Investigation of some Indian Cardiac Drugs and other poisonous plants of India, begun 1954, to be completed in 1958.
- K. Hanumantha Rao, Chemical Investigation of Indian Medicinal Plants, begun 1956, likely to be completed in 1960.
- T. Krishna Murty, Chemical Investigation of Indian lichens, begun 1956, likely to be completed in 1960.

## PHYSICS

### M. Sc.

- C. V. Narayana Rao, Physics on the Ultraviolet fluorescence spectra of iodine molecule.
- I. Achyuta Rao, Interpretation of the near ultraviolet absorption spectrum of acetaldehyde molecule as due to a single electronic transition.
- V. Venkatadurgavati, Physics investigation on the high multiplicate transitions in Molecular spectra.
- N. Durga Prasad, On the visible Band spectrum of Tellurium.
- J. V. Ramana Rao, A Study on the Band spectra of Thallium Iodide and fluoride.
- V. Leelavathi, Investigations on the spectrum of selenium.
- H. S. Rama Rao, Studies on Temperature effect on ultrasonic velocities in liquids and excitation of shear modes of vibration in solids.
- P. Venugopala Rao, A modified wedge method for the study of Elastic constants of 28 isotropic media.
- B. Ramakrishna Rao, Ultrasonic Studies in Fatty Acids (Acetic and propionic Acids).
- B. L. Narasimha Rao, Ultrasonic Studies in Fatty Acids (Formic and Butyric Acids).
- D. V. G. L. Narasimha Rao, Calculations of dipole Moments of Tri Substituted Benzenes and on experimental Determination of the Dipole Moment of Indone.
- K. Visweswara Rao, An experimental investigations on the dipole Moments of Thionaphene and Campher oxime.

- B. C. Narasinga Rao, Periodic fading of medium Wave Radio signals due to Ionisation Change.
- N. V. Gurunatha Sarma, Studies on Periodic fading of Medium and short wave Radio signals due to lower lifting.
- D. Tirumalesa, Force constants and thermo-dynamic properties of  $TiCl_4$  Molecules.
- S. Paddi Reddi, On the visible absorption Band Spectrum of Selenium Dioxide.
- S. V. J. Lakshman, On the emission spectrum of Ionised Molecule  $Cl_2$ .
- Miss C. Santha Bai, The Complex Band Spectrum of Diatomic Manganese Chloride.
- M. S. V. Gopala Rao, Studies on Ionospheric Absorption.
- K. V. V. Ramanna, Studies on Radio fading and wind Velocities in Ionosphere.
- K. Venkata Reddi, Studies on the Phase Shift Networks and electronic switches.
- C. Krishnamurti, Ultrasonic Studies in Gels and Starch suspensions in liquids.
- M. Ramakrishna Raju, Ultrasonic Velocities Electrolytes and liquids.
- D. Ranga Rao, A new electrical method for determining crystal currents and its application to Ultrasonics.
- G. Venkata Rao, Studies in Ultrasonics Elastic constants of Staurelite.
- A. Muralidhara Rao, Ultrasonic absorption and Velocity, measurements in Barium Nitrate solutions.
- I. V. V. Raghavachari, Torsional Waves in Solids of Crystalline Media.
- M. Jagannadha Rao, The near ultraviolet absorption spectra of B. Fluorona Phthalene Molecule.
- N. V. R. Appa Rao, Studies in the Electronic Spectra of Molecules containing C.O.
- Miss Uma Devi Gantayet, The near Ultraviolet absorption Spectrum of Ortho-Chloro-Ethylbenzene.
- M. Satyanarayana Murty, Ultrasonics and Electrolytes.
- M. V. S. Sambamurty, Dielectrics.
- Kumari P. R. K. L. Padmini, Ultrasonics.
- N. Prahladasastry, Nuclear Physics.
- K. Sitaramasastry, Nuclear Physics.
- B. Durganageswara Rao, Nuclear Physics.
- V. V. S. Sriramamurty, Electronics.
- C. Abhirama Reddy, Wireless.
- B. Lakshminarayana, Microwave propagation and its application to dielectrics.
- J. Sobhanadri, Microwave propagation and its application to dielectrics.
- R. Rajan, Microwave propagation and its application to dielectrics.
- G. Sitaramamurty, Spectroscopy.
- M. G. Seshagiri Rao, Studies on periodic fading in short-wave Radio Signals Multiply reflected from different Ionospheric Layers'.
- B. V. Krishna Murty, Theoretical study on group height variations in Low Frequency range.
- Kumari G. Kanaka Durga Bai, On the Emission spectrum of Po Molecule.
- D. V. Rangarao, On the complex band spectrum of Titanium chloride.
- M. Venkanna Pantulu, Ultrasonic Studies in some organic Solid Liquid Mixtures.
- K. Hanumantha Rao, Study of the Dielectric Properties of liquids and liquid Mixtures.

- G. Krishna Murty, Study of the absorption of gases in Microwave Region (3 cms.)
- E. V. Raghunadha Rao, Development of the Super-regenerative Oscillator Technique for the Study of Nuclear Moment.
- G. V. Subbarayudu, Studies in Complex formation in uranium salts.
- V. Muralidhara Rao, Ultra High Frequency Absorption in Liquid and Liquid Mixtures.
- A. Bhanumati, Dipole moments and relaxation times of some Ethyl Esters at 3 CM.
- V. Nagarajan, Studies in Nuclear Magnetic Resonance.
- Y. V. Ramanamurty, Investigation of special F. Behaviour and the effect of Magnetic activity on drifts.
- V. Sivaramamurti, The emission band spectrum of Tellurium Monoxide.
- P. Seshadri, Studies in Radio Fading in Relation to drift Measurements.

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Prof. K. Nagabhushanam,

1. Three Seminars on Economic Models, pub. as Stencil memos of Indian Statistical Institute, 1954.
2. Inference in Time Series, read as Presidential address to the Statistics section of the Indian Science Congress 1956.
3. A report on the Household Budgets of the Port and Ship-yard workers of Visakhapatnam, Submitted to the Research Programmes Committee of the Planning Commission.
4. A report on Housing in Visakhapatnam, Submitted to the Research Programmes Committee of the Planning Commission.
5. Report on the Urbanization of Visakhapatnam, Submitted to the Research Programmes Committee of the Planning Commission, Government of India, 1957.
6. Statistical Methods in Economic Research, read at the Symposium in the Statistics section of the Indian Science Congress, 1958.
7. Impressions of tour of selected villages in Nagarjunasagar Project ayacut area, Submitted to the Nagarjunasagar Control Board, 1958.
8. On equally correlated stationary processes (Jointly with V. K. Murty.) pub. in Bulletin Calcutta Statistical Association, 1954.
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Dr. T. V. Avadhani,

1. On summation over Lattice points, pub. in Journal of the Indian Mathematical Society, 1954.
2. On the summability of Eigen function expansions I, pub. in Jour. Ind. Soc., 1954.
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- G. V. Ramana Murty. (Govt. of India Research Scholar, with Prof. K. Nagabhushanam), Estimation of adult equivalent scales, paper read before the Indian Conference on Research in National Income, Calcutta, 1958.
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T. S. Satyanarayana Rao,

- (1) "Studies on the Chaetognatha of the Visakhapatnam Coast : Part I : Seasonal fluctuations in relation to salinity and temperature", published in *Andhra Univ. Ser. No. 49, Mem. in Oceanogr. 1*, 1954.
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- (6) "Studies on Chaetognatha in the Indian Seas. Part II. The Chaetognatha of the Lawson's Bay, Waltair", published in *Andhra University Ser. 62, Mem. Oceanogr. 6*, 1958.

K. G. Raja Bai Naidu,

- (1) "The post larval development of the shore crab *Ocypoda platyttersis*, N. Edwards and *Ocypoda cordinana* Desmarest", published in *Proc. Ind. Acad. Sci.* 40, 1954.
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- (3) "On some Crustacean wood-borers in the Visakhapatnam harbour", published in *Current Science*, 24, 1955.
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- (5) "Tolerance of the Marine Wood-borer, *Martesia striata* (Linn.) to waters of low salinity", published in *J. Zool. Soc. India.* 7, 1955.
- (6) "Digestive enzymes of *Martesia striata* (Linn.)", published in *Current Science*, 25, pp. 156, 1956.
- (7) "The Rate of water-filtration in the marine wood-boring mollusc, *Martesia striata* (Linn.)", published in *Proc. Ind. Acad. Sci.* 43, 1956.
- (8) "On the development of the Marine wood-boring Mollusc, *Martesia striata* (Linn.)", published in *Science and Culture*, 22, 1956.
- (9) "Biology of Fouling in the Visakhapatnam Harbour", published in *Andhra University Ser. 62, Mem. Oceanogr.* 2, 1958.
- (10) "Seasonal distribution of the Hydromedusae of the Visakhapatnam Coast", published in *Andhra University Ser. 62, Mem. Oceanogr.* 2, 1958.
- (11) "Record of a new Pholad, *Penitella* sp. from Shingle Island (in the Gulf of Mannar) with a note on its distribution", published *Current Science*, Vol. 27, No. 10. pp. 394.



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Kumari P. Sathyavathi, Studies on Foraminefera from ocean deposits off the Waltair Coast.

Kumari M. Dharmamba, Distribution of the crustacea larve in the plankton off Waltair Coast.

Kumari D. Krishna Kumari, Plakton Studies

D. Venkata Rama Sarma, Hydrography in relation to the production of plakton off the Waltair Coast.

Miss K. Bhavani, Studies on the Fish eggs and larvae of Waltair Coast.

K. Srinivasarao, Bionomics of some marine Food fishes of Waltair Coast.

M. V. Lakshmana Rao, Studies on the Ecology of the Interdial sands of the Visakhapatnam Coast.

Miss. K. Rajyalakshmi, The Anatomy of *Barkudia Insularis* Amandalo.

G. Balakrishnamurti, Studies on the zonation of Fauna and Flora on the intertidal rocks at Waltair.

K. V. Narayana, Studies on the Biology of some Tharine fishes of Waltair.

A. Narasimha Sastri, Studies on the Biology of some Mollurca.

M. V. Narasimha Rao, Studies on the marine ciliates of Visakhapatnam.

K. Varadaraja Ayyangar, Studies on the Estuarine Plankton Fish eggs and Larvae.

Y. Radhakrishna, Studies on the Polychaete larvae occuring in the plankton off Waltair Coast.

P. V. Bhavanarayana, Estuarino Hydrography in relation to production of Plankton of Kakinada Bay.

D. V. Subba Rao, Plankton Studies.

M. Subrahmanyam, Studies on the Biology of some Crustacia.

A. V. R. G. Krishnamurty, Studies on Invertebrate Larvae (other than Crustacea) in Plankton off Waltair.

Kumari K. Shyama Sundari, Studies on the Planktonic Adult Crustacla (Other than copepoda) Waltair Coast.

K. Sreenivasa Rao, Systematics and Seasonal distribution on Hydromedusae occurring in the plankton off Waltair Coast.

G. Luther, Studies on the Plaktonic Copepoda Off Waltair Coast.

M. Subrahmanyam, Studies on the Plaktonic Decapod and stomatopod Larvae off Waltair Coast.

D. G. V. Prasada Rao, Periodicity of the phytoplankton of the surface waters of the Waltair Coast and Productivity of inshore waters.

P. V. Bhavanarayana,

1. On the vertical distribution of Chemical constituents in the shelf waters off Waltair, pub. in *Proc. Ind. Acad. Sci.* 44, 1956.

2. On the replenishment of some plant nutrients during the upwelling period on the east coast of India, pub. in *Ind. Jour. Fish.* 4, 1957.

3. On a thermal feature of bottom waters during upwelling on the east coast of India, pub. in *Ind. Jour. of Met & Geophysics*. 8, 2, pp. 209—212, 1957.
  4. Pelagic Tunicates as Indicators of water movements off Waltair Coast, pub. in *Current Science*, 27, 1958.
- Y. Radhakrishna, Studies on the Polychaete larvae in the plankton off Waltair Coast, pub. in *Andhra University Ser. 62, Mem. Oceanogr.* 2, 1958.
- D. V. Subba Rao,
1. On upwelling and productivity of the waters off Lawson's Bay Waltair, pub. in *Current Science*, 26, pp. 347-348, 1957.
  2. Dredging and Phytoplankton production, pub. in *Current Science*, 27, pp. 349, 1958.
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- D. V. Rama Sarma, Hydrography in relation to the production of plankton off Waltair Coast, pub. in *Andhra University Ser. 62, Mem. Oceanogr.* 2, 1958.
- K. Rajyalakshmi, Bionomics and some anatomical peculiarities of the limbless lizard *Barkudia insularis* Annandale, pub. in *Rec. Ind. Museum*, 53, 1958.
- M. V. Narasimha Rao,
1. Macronuclear reorganisation in *Diophrys appendiculata* (Ciliata *Hypotricha*), pub. in *Current Science*, 25, 360-361, 1956.
  2. Systematic survey of Marine ciliates from Visakhapatnam, pub. in *Andhra University Ser. 62, Mem. Oceanogr.* 2, 1958.
  3. Mating types in *Stylonychia pustulata*, pub. in *Current Science*, Vol. 27, No. 10, pp. 395, 1958.
- M. V. Narasimha Rao, Studies on the Marine ciliates of Visakhapatnam, begun in 1954, likely to be completed in 1955.
- P. V. Bhavanarayana, Estuarine hydrography in relation to production of plankton of Kakinada Bay, begun in 1954, likely to be completed in 1955.
- A. Narasimha Sastry, Studies on the Biology of some Mollusca, begun in 1954 likely to be completed in 1955.
- K. Varadaraja Aiyangar, Studies on the Estuarine plankton Fish eggs and Larvae, begun in 1954, likely to be completed in 1955.
- M. Subrahmanyam, Studies on the Biology of some Crustacea, begun in 1954, likely to be completed in 1955.
- Y. Radhakrishna, Studies on the Polychaete larvae occurring in the plankton off Waltair Coast, begun in 1954, likely to be completed in 1955.
- D. V. Subba Rao, Plankton Studies, begun in 1955, likely to be completed in 1956.
- M. Subrahmanyam, Studies on the planktonic decapod and stomatopod larvae off Waltair Coast, begun in 1956, likely to be completed in 1956.
- A. V. R. G. Krishna Murty, Studies on Invertebrate larvae (other than crustacea) in plankton off Waltair, begun in 1956, likely to be completed in 1957.

- G. Luther, Studies on the planktonic copepoda off Waltair Coast, begun in 1956, likely to be completed in 1957.
- M. Srinivasa Rao, Systematics and seasonal distribution of hydromedusae occurring in the plankton off Waltair Coast, begun in 1956, likely to be completed in 1957.
- K. Shyamasundari, Studies on the planktonic Adult crustacea (other than copepoda) off Waltair Coast, begun in 1956 likely to be completed in 1957.
- D. G. V. Prasada Rao, Periodicity of the phytoplankton of the surface waters of Waltair Coast and productivity of the inshore waters, begun in 1956, likely to be completed in 1957.

# **ANNAMALAI UNIVERSITY**

## **Arts**

### **ECONOMICS**

#### **Ph. D.**

- C. S. Krishnan, The Handloom Industry in Madura District, begun 1954.
- K. Vasudevan, Indian Labour and International Labour Organisation 1917-1953, begun 1954.
- A. Ramaswamy, Agricultural Legislation in South India from 1919-1952, begun 1954.
- T. K. Krishnaswamy, Public Utilities in India — Problems and Organization, begun 1955.

#### **M. Litt.**

- G. Soundararajan, The History and Problem of Finance in Madras from 1935-1953, begun 1954.
- A. Sivaprakasam, The Land (Agricultural) Problems in South Arcot District, begun 1955.
- S. T. Vaithilingam, The Sales Tax in India 1935-1955, begun 1955.
- S. Ramachandran, Farm costs in selected villages of South Arcot District, begun 1956.
- A. V. Rengachari, The Reserve Bank of India and Agricultural Development with special reference to Madras State, begun 1956, likely to be completed in 1958.
- K. Venkataraman, Madras State in the First and Second Five Year Plans, begun 1955.
- T. S. Rajamani, Marketing of Paddy, Sugarcane and Groundnuts in Tanjore and South Arcot Districts, begun 1957.
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### **ENGLISH**

#### **Ph. D.**

- G. Gopalakrishnan, English Poetic Drama in our Times, begun 1956.

#### **M. Litt.**

- V. Sachidanandan, The development of the Mind and Art of Somerset Maugham with special reference to his fiction, begun 1955.
- K. B. Sethramaiya, The substance of Tragedy—a comparative study of English, Sanskrit and Greek Drama, begun 1955.

**HISTORY****D. Litt.**

- R. Sathiyanaathaier, Tamizhagam in the 17th Century published by the University of Madras in 1956.
- P. K. Srivirarayan Raja, the Development of Rules of Law in British India upto Dalhousie.
- S. Sundararajan, Historical Materials in the Purananuru.

**Ph. D.**

- D. Balasubramanian, Women in Tamil History and Literature.
- B. V. Ramanujam, History of Vaishnavism upto Ramanuja, begun 1954, likely to be completed in 1958.
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- S. Thirugnanasambandam, The Later Pandyas, begun 1955.
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**M. Litt.**

- N. K. Gopalakrishnan, the Judicial System of English East India Company, begun 1957.
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- A. P. Ibrahim Kunju, The British in Malabar, begun 1954, completed in 1956.

**PHILOSOPHY**

- K. Swaminathan, Field Theory in Psychology begun 1956, to be completed in 1959.
- R. Kolappa Pillai, A Psychological investigation of some aspects of memory begun 1958 to be completed 1960.

**TAMIL**

- S. Thirunavukkarasu, Thiru-vi-ka an evaluation of his contribution to Tamil culture began August 1958 to be completed in August, 1959.

**M. Litt.**

- S. Vaithilingam, Fine Arts and crafts in Pathuppattu and Ettuthogai, begun 1958, to be completed in 1959.
- P. Arunachalam, Maraimalai Adigal, begun 1954, to be completed in 1959.
- M. Annamalai, Vaishnavism with special reference to First Three Alwars, begun 1958, to be completed 1959.
- S. P. Ramanathan, Paranjothi Munivar's Thiruvilayadal Puranam, begun 1958, to be completed 1959.
- S. V. Shanmugam, Nachinarkkiniyar conception of Tamil Phonology, begun 1958, to be completed 1959.

## Science

### AGRICULTURE

#### Ph. D.

- N. Narayana Prasad, Growth and development, Natural and through plant regulators, in Horticultural plants, begun 1957.  
 Rao Rama Rao, Improvement of Some South Indian Vegetables, begun 1957.

#### M. Sc.

- C. N. Sankaran Nambudiri, Physiological Studies (Mollusca), begun 1955.  
 C. A. Lawrence, An Ecological Study of Maruthuva Malai, begun 1955.  
 S. V. Pandurangan, Root Studies in Paddy, begun 1955.  
 J. C. Samraj Daniel, Studies on Indian Vegetables, begun 1955.  
 A. R. Lakshmanan, Propagation Studies in Tropical and Sub-tropical Fruits, begun 1957.  
 P. Beeranna Bhandari, Studies on the responses of some solanaceous vegetables and Bhindi (*Shelmoscusp esculentus* (L.) Meench) to applications of certain plant regulators, begun 1955, completed 1957.  
 C. N. Sambandam, Studies on some *Alternaria* leaf-spot of Solanaceous plants, begun 1958 to be completed 1959.  
 S. Chandrasekaran, Studies on *cercospora* spp. on and around Annamalai-nagar, begun 1958, to be completed 1959.

### BOTANY

#### Ph. D.

- Miss. C. P. Godawari, On the anatomy of the acclimatised conifers of South India, begun 1954.  
 K. K. Eswaran, Ecology of South India, begun 1956.  
 C. Srinivasan, Studies on the Masses of South India, begun 1954.

#### M. Sc.

- A. V. Natarajan, Studies on the Egg masses and Larval Development of some Gastropods from the Palk Bay and the Gulf of Mannar, begun 1954, completed 1956.  
 S. Panneerselvam, Phasic development of plants, begun 1954, completed 1957.

### CHEMISTRY

#### Ph. D.

- Miss A. A. Aleykutty, Fries arrangement of Aryl Sulphonates, begun 1954, completed 1956.  
 T. S. Govindarajan, Studies on Thiophenols, begun 1954, completed 1958.  
 A. Ekambaram, Studies in the Chemistry of Pyridine, begun 1954.  
 T. Rengarajan, Studies on Sulphones, begun 1954.  
 R. Varadachari, Studies on Sulphides, begun 1954.  
 K. Ganapathy, Studies on the preparation and properties of Selenones, begun 1955.  
 V. V. Ramanujam, Studies in the Chemistry of metal chelate compounds, begun 1955.

- K. M. Somasundaram, Physico-Chemical aspects of the di-electric behaviour of liquid solutions, begun 1955, completed 1958.  
 S. Sambasivam, Kinetics of the reactions between nitrous and Hydriodic acids, begun 1955.  
 P. Subbarayan, Substitutions through Metallation, begun 1956.  
 Miss M. Uma, A study of the influence of some polar and steric effects on reactivity, begun 1956.  
 V. V. Subbarayudu, Studies in Stereochemistry, begun 1956.  
 S. Krishnamurthi, Study of Structure from Infra-red-spectra, begun 1957.  
 A. Mangalam Udaiyar, Substitution in Carbocyclic and heterocyclic compounds, begun 1957.  
 S. M. Seshapati Rao Naidu, Reaction mechanisms, begun 1957.

### M. Sc.

- V. K. Venkatesan, Conductivity of strong solutions of electrolytes, begun 1955, completed in 1957.  
 Srimathi S. Alamelu, Conductivity of highly concentrated solutions of electrolytes, begun 1955, completed 1957.  
 K. Aparajithan, Large rings containing sulphur as a heteroatom, begun 1955, completed 1958.  
 V. Ramakrishnan, The Behaviour of organic compounds in ethanolamine and sulphuric acid, begun 1955, completed 1957.  
 V. Balasubramanian, Sulphur compounds of acenaphthene and fluorene, begun 1956.  
 K. J. Raman, Conformational analysis of some piperidine derivatives, begun 1956.

## MATHEMATICS

### D. Sc.

- M. S. Ramanujam, Matrix methods of Summability with special reference to Housdorff and Quasi-Housdorff Methods, completed 1957.

### Ph. D.

- N. Ganesan, Modern Algebra and Higher Analysis, begun 1955.

### M. Sc.

- S. Swetharanyam, Theory of numbers and Higher Analysis, begun 1955, completed 1957.  
 K. S. Padmanabhan, Theory of Functions, begun 1957.  
 M. Baskaran, Theory of Numbers, begun 1957.  
 K. Raman Unni, Higher Analysis, begun 1957.  
 V. Krishnamoorthi, Higher Analysis, begun 1957.  
 S. Rengachari, Mathematical statistics, begun 1956.

## PHYSICS

### Ph. D.

- P. Thirugnanasambandam, Studies in Ultrasonic propagation in Liquid solutions, begun 1954, completed 1958.  
 S. Sundaram, Studies in Raman Effect, begun 1954, completed 1956.  
 T. Murugaiyan, Electro Osmosis, begun 1954.

- S. Sriraman, Studies in Magnetism, begun 1955, completed 1957.  
 A. S. Ramanathan, Astro Physics, begun 1955, completed 1957.  
 M. G. Krishna Pillai, Studies in Raman Effect, begun 1955, completed 1958.  
 K. Ramanathan, Magnetic and allied properties of South Indian Rock, begun 1955.  
 G. Thiagarajan, Spectroscopy, begun 1956, to be completed in 1958.  
 S. Natarajan, Spectroscopy, begun 1956.  
 S. Ponnuswami, Studies in Geophysics, begun 1957.  
 K. Vijayaraghavan, Crystal Physics with special reference to X-ray methods, begun 1956.

#### **M. Sc.**

- K. Ramanathan, Studies in Magnetism and Earth Resistivity Data, begun 1954, completed 1955.  
 M. G. Krishna Pillai, Studies in Raman Effect, begun 1954, completed 1955.  
 R. Vijayaraghavan, Nuclear Induction, begun 1954.  
 V. S. Angappan, Studies in Raman Effect, begun 1955, completed 1957.  
 V. Somasundaram, Spectroscopy with special reference to studies in Raman Effect, begun 1956, completed 1958.

### **STATISTICS**

#### **Ph. D.**

- V. R. Nandagopal, Mathematical Statistics, begun 1957.

### **ZOOLOGY**

#### **Ph. D.**

- Miss V. R. Meenakshi, Physiological Studies of Gastropods (with special reference to digestion and metabolism), begun 1954, completed 1957.  
 K. Rengarajan, Studies in the Physiology of Estuarine Animals, begun 1957.  
 K. P. Krishnamurthi, Physiological Studies — Fishes, begun 1957.  
 B. Seshadri, Studies in the Physiology of Fishes, begun 1957.  
 R. Natarajan, Cytological Studies, begun 1957.  
 begun 1954.  
 R. Ranganathan, Eco-Cytology of the constituents of South Indian Vegetations, begun 1955.

#### **M. Sc.**

- A. V. Natarajan, Studies on the egg masses and larval development etc., begun 1954, completed 1956.  
 Mrs. P. Shankaramurthy, Cytological Studies — Coleoptera, begun 1957.  
 R. Natarajan, Contributions to cytology of Indian Anura, begun 1957.  
 V. R. Muthukaruppan, Physiological Studies of Fish, begun 1957.



## **BARODA**

### **Arts**

#### **ARCHAEOLOGY**

##### **Ph. D.**

- Chowdhary Sooryakant Narsinh, Archaeological survey of North Gujarat, begun 1954.
- R. Joshi Munischandra, Life as depicted in the Art of Ajanta. (A study in the material life from painting, sculpture and inscriptions), begun 1956.
- Malik Subhaschandra Ramlal, (Anthropo) studies in the Pre-history of Western India with special reference to Gujarat, begun 1957.
- Raikar Yashwant Anant, Studies in the Cultural History of Western India from 700 to 1200 A.D., begun 1957.

#### **ECONOMICS**

##### **Ph. D.**

- Shah Suresh Thakorlal, Role of Cottage Industries in India with special reference to Gujarat, begun 1955.
- Gandhi Rasiklal Kasturchand, Structure of Banking and Economic development with special reference to India, begun 1956.
- Nandedkar Durganath Janardan, Socio-Economic conditions of workers in the Bombay Film Industry, begun 1956.
- Desai Ashokkumar Lalbhai, Industrial Organisation with particular reference to Indian conditions, begun 1957.
- Desai Jayesh Jasvantrai, Changing pattern of Rural Economy of Gujarat, begun 1957.
- Smt. Bhimnathmala Sharmishtha Anurital, Post-War Monetary and Banking Trends in India, begun 1958.

#### **ENGLISH**

##### **Ph. D.**

- Pathak Chandrakant Jayantital, The Early Poetry of Shri Aurobindo, begun 1954.
- Umerwadia Ramanbhai Lalbhai, A study of the acts and expressions of courtesy in the plays of Shakespeare, begun 1956.
- Maniar Umedbhai Motichand, The influence of English on Gujarati Poetry, begun 1956.
- Rao Narasimhi Madhava, Symbolism in Modern English Poetry, begun 1956.
- V. Gopalan Kutty, Sean O'case, as a dramatist—A critical study, begun 1957.
- Mehta Purushottam Pragji, Trends in Indo-Anglian Fiction, begun 1958.

## GUJARATI

### Ph. D.

- Parekh Somabhai Dhulabhai, A critical edition of Panchdan gani Varta in old Gujarati prose (before 1682 A.D.) with a comparative study of literary works on the same theme in Sanskrit and Gujarati, begun 1956.
- Trivedi Harshadray Manibhai, Prof. B. K. Thakore, His life and works, begun 1957.
- Jadeja Dilavarsinh Dansinh, Premanand and his works, with special reference to the cultural data supplied by them, begun 1957.

## HINDI

### Ph. D.

- Mahendra Pratapsingh Harpalsingh, Gujarati ke Madhyakalin (1600-1900 Vikram) Hindi Kavi aur Hindi Bhasha mam Sahitya ki Shri Vruddhi me unka yog, begun 1958.

## HISTORY

### Ph. D.

- Kaul Iqbal Narain Suraj Narayan, Bhopal during the Mutiny, begun 1955.
- Joshi Vasant Govind, Baroda Administration under Raja Sir T. Madav Rao, begun 1955.
- Ganam Nasirmiya Mohamedmiya, History of Gujarat under Jahangir and Shahjahan, begun 1957.
- Mehta Makrand Janaklal, Social aspects of British, begun 1957.
- Desai Shantilal Keshavlal, Baroda State under Maharaja Khanderao (A.D. 1856 to A.D. 1870), begun 1958.

## MARATHI

### Ph. D.

- Ayachit Prabhakar Kashinath, Some aspects of the social life of Maharashtra as reflected in the Marathi Social dramas of the 19th century, begun 1955.
- Dabhade Madhav Govind, A critical survey of Autobiographies in Modern Marathi Literature, begun 1958.

## PHILOSOPHY

### Ph. D.

- Patel Shantilal Maganlal, Philosophy of Shrimad Rajchandra, begun 1955.
- Vora Abdulsattar Haji Ibrahimhai, The Social Philosophy of Islam, begun 1955.
- Patel Dinubhai Muljibhai, The Dynamic Philosophy of Shri Aurbindo, begun 1955.
- Parmar Ghanshyam Govindsinh, Contribution of the Vivarana school to Sankara Vedanta, begun 1957.

## POLITICS

### Ph. D.

- Gupta Ram Chandra Omkarprasad, Conceptions of Individual & Authority in the Political Ideas of H. J. Laski, begun 1957.
- Bhalerao Chandrasen Nathan, The Bombay Public Service Commission, begun 1957.
- Shah Pradeep Jasubhai, Technique of political investigation and the conception of democracy in the political ideas of Graham Wallas, Walter Lippmann and Harold Lasswell, begun 1957.
- Smt. Udyawar Yamunabai Someshrao, Political Philosophy of John Stuart Mill, begun 1958.

## SANSKRIT

### Ph. D.

- Desai Harshadrai Gulabbhai, Critical study of Jayakhya Samhita, begun 1956.
- Dave Sureshchandra Kanaiyalal, A critical and cultural study of the Vamana Purana, begun 1956.
- Smt. Trivedi Surabhi Hrushikesh, Brahma Purana—A critical study, begun 1957.
- Smt. Desai Nileshwari Yadukant, Ancient India Society, Religion and Mythology in the Markandeya Purana (a critical study), begun 1957.
- Pathak Madhusudhan Madhavlal, Simile in the Ramayana, begun 1957.
- Shastri Arunchandra Devshanker, Purusottamji of study, begun 1957.
- Gandhi Ramanlal Hiralal, Shri Gokulnathji's contribution to Shuddha Adwaita Vedanta, begun 1957.

## SOCIOLOGY

### Ph. D.

- K. Unni Raman, Caste in South Malabar, begun 1954.
- Patel Ambalal Shivilal, Social Background of the High School students in Kaira Dist., begun 1954.
- Smt. Desai Neera Akshayakumar, 19th Century Gujarati Society from Literary Sources, begun 1955.
- Shah Arvindbhai Manilal, Social structure and change in a Gujarati village, begun 1955.
- Shah Buddhishchandra Vadilal, Social Background of Baroda University students, begun 1955.
- Joshi Vishnushanker Hargovind, An inquiry into the social consequences of Industrialisation and urbanisation in the rural area of Southern Gujarat with special reference to tensions between groups and classes, begun 1956.
- Parikh Ratilal Dahyabhai, Social background and impact of the Gujarati Press (with special reference to recent times), begun 1956.
- Sheth Narayan Ranchhodlal, The social background of some industrial workers in Baroda City, begun 1956.
- Smt. Gnanambal Kuppuswamy, The religion of three Travancore tribes, begun 1957.

**Shroff** Rameshchandra Gordhandas, Social conditions obtaining in some parts of the Charotar area during the years 1800 to 1850 A.D., begun 1957.

**Sheth** Tarun Natverlal, The English Educated and the Society with special reference to Gujartai Society—early 19th Century to early 20th Century, begun 1957.

## Science

### BIO-CHEMISTRY

#### Ph. D.

**T. N. Sekharavarma** T. Chitran Nambudri, Studies on the Bio-synthesis of Citric Acid in Citrus fruits, begun 1956.

**Smt. Sathe** Vanmala Janardan, Enzyme Synthesis in Molds, begun 1956.

**Joshi** Arvind Purshottam, O<sub>4</sub> Metabolism in A Niger, begun 1956.

**Shah** Mukundlal Muljibhai, Nutritional aspects of Toxaemices, begun 1957.

**Gothoskar** Balwant Pandurang, Studies on Tissue Culture, begun 1957.

**Apte** Bhalchandra Keshav, Studies in Gastric Secretory function, begun 1957.

**Patel** Nutankumar Thakorlal, Biosynthesis of Organic acids in Tamarind, begun 1958.

**Raina** Premnath Mahishwarnath, Studies on Tissue Culture, begun 1958.

**Deodhar** Arvind Dattatraya, Studies on Human Lactation, begun 1958.

**Karmarkar** Madukar Ganesh, Studies on Human Lactation, begun 1958.

### BOTANY

#### Ph. D.

**Mehta** Atul Ramakant, The grasses of Gujarat, begun 1954.

**Joshi** Bhalchandra Balkrishna, Flora of Baroda (10 miles round the University campus), begun 1955.

**Oza** Gunavantrao Maneklal, Flora of Pavagadh, begun 1957.

**Sabnis** Sharad Dwarkanath, Studies on Cyperaceae, begun 1957.

**Bhatt** Rajendra Prangovind, Morphogenesis of Tendril & Axillary bud in Cucurbitaceae and Passifloraceae, begun 1957.

**Deshmukh** Yeshwantrao Shankerrao, Organogeny and Cyto-embryological studies in some of the Bicorpellatae, begun 1958.

### CHEMISTRY

#### Ph. D.

**Lele** Sadashiv Shamrao, Studies in Anthracene Derivatives, begun 1954.

**Desai** Narendra Jayantilal, Studies in Xanthenes, begun 1955.

**Lohar** Jayanarayan Mangaliprasad, Mixed Liquid Crystals—Effect of Structure on Transition Temperature, begun 1956.

**Talati** Ambalal Muljibhai, Studies on Chelates and Chelaton, begun 1956.

**Shah** Nathalal Himatlal, Studies in Hydroxyanthracene derivatives, begun 1956.

**Patel** Ravindra Prabhudas, Synthetic Drugs, begun 1957.

**Patel** Melabhai Gulabbhai, Studies on Isocoumarins, begun 1958.

Shah Manubhai Vrajlal, Studies on Chromones, begun 1958.

Patwa Pravinchandra Kantilal, Interaction of (i) arsanitic acid and (ii) Stibanilic acid respectively with the Bromo derivatives of the substituted acids of Cyanoacetic acid, begun 1958.

Patel Ambalal Rajibhai, Studies on Chelate compounds, begun 1958.

Patel Gordhanbhai Hirabhai, Formation of quinoline derivatives on Cyclisation of substituted amides of cyanometiz ester using polyphosphoric acid, begun 1958.

## PHYSICS

### Ph. D.

Patil Hari Narayan, Some Theoretical and Experimental studies in Thermal Convection, begun 1955.

Kaul Iqbal Krishen, Analysis of some Transistor circuits, begun 1955.

Trivedi Ganpatishanker Kashiram, To study the growth of Ionic crystals, begun 1955.

Pandya Janardan Rameshchandra, Optical studies of Growth and Etch features on crystal surfaces, begun 1957.

Desai Harnivas Sanatkumar, Heat Transfer Phenomena, begun 1957.

Shah Chandrakant Jeyshingbhai, Optical studies and Hardness measurements on Metal crystals, begun 1958.

## STATISTICS

### Ph. D.

Khatri Chinubhai Ghelabhai, On certain problems in Multivariate Analysis, begun 1957.

## ZOOLOGY

### Ph. D.

Patel Bhupendrakumar Sharadchandra, Studies on the Physiology of Aestivation, begun 1955.

Naik Ramechandra Maganlal, Studies on Morphologico-physiological evolution of animals, begun 1956.

Scaria Kuttemperoor, Studies on the Structure and Physiology of Vertebrates, begun 1956.

Pishawikar Sharad Dattatraya, Morphologico-physiological aspects of animal life, begun 1957.

Eapen Jacob K. J. Eapen, An Investigation on the relation between structure and function in Vertebrates, begun 1957.

Kumari Patel Shakunt Shivabhai, Studies in Vertebrate Structure, begun 1957.

Pullolickal Iype Thomas, Studies on Muscle Physiology, begun 1958.

Telesara Chunnilal Laxmichandji, Studies in Physiology of the muscle tissue, begun 1958.

## **BOMBAY**

### **Arts**

#### **ANCIENT INDIAN CULTURE**

##### **Ph. D.**

- Srivasthava Hemaleta, *The Minas of Rajasthan*, begun 1954, likely to be completed 1959.
- K. V. Hariharan, *Seafaring in the Proto-Indian period of Indian History*, begun 1954, likely to be completed 1959.
- K. R. Rajagopalan, *The Significance of Agastyasami in the History of South India*, begun 1954, likely to be completed 1959.
- M. G. Bhagat, *Proto-Indian Origin of Asceticism*, begun 1954 likely to be completed 1959.
- Khan Mohamed Sagir, *The migration of the Dolmanic Culture of the Proto-Indians*, begun 1955, likely to be completed 1960.
- V. G. Pande, *The Guptas of Gujarat*, begun 1955, likely to be completed 1959.
- Miss V. Kulkarni Indu, *Cultural History of Early Mediaeval India*, begun 1956, likely to be completed 1960.
- S. C. Patel, *Ideals & Social Aspects of Education in Ancient India*, begun 1956, likely to be completed 1960.
- V. S. Emani, *Life & Culture of the people during the Satavahanas*, begun 1958.

#### **BUDDHIST LITERATURE**

##### **Ph. D.**

- Prof. (Mrs.) Meena Talim, *Woman as depicted in early Buddhist Literature*, begun 1954, likely to be completed 1959.

#### **ECONOMICS**

##### **Ph. D.**

- Genars C. Da Costa, *Reaction of the Indian Economy to External Fluctuations*, begun 1957, likely to be completed 1960.

#### **EDUCATION**

##### **Ph. D.**

- Smt. Tara V. Sabnis, *Standardisation of Physical Efficiency Tests for Girls—8 to 17 years of age*, begun 1954, likely to be completed 1959.
- G. Y. Tulpule, *Construction and Standardisation of Mechanical Aptitude Tests for Indian Children* begun 1954, likely to be completed 1959.
- N. P. Dave, *A Study of Language and Arithmetical Abilities of the Children between 7 and 13 years in Bombay Gujarati Schools*, begun 1954.

- A. K. Pathak, Construction and Standardisation of Group Intelligence Tests in Marathi for ages 9 to 13, begun 1955, likely to be completed 1956.
- R. A. Nabar, Education in the City of Bombay from 1820 to 1920 begun 1955, likely to be completed 1959.
- Smt. P. A. Bhawalkar, Effects of Socio-Economic Conditions on the progress of Pupils in Secondary Schools, begun 1955.
- P. S. Lalwani, Growth of National Education in India begun 1955.
- R. G. Pandya, Assessment of Modern Educational Values from different viewpoints, begun 1955.
- G. T. Matta, Problems Educational and Social of Refugees in the State of Bombay, begun 1955.
- H. P. Patel, Basic Education and its Working in the State of Bombay, begun 1955.

#### **M. Ed.**

- C. M. Mehta, Adaptation and Standardisation of a test of abstract reasoning for Age group 14 to 16 years, begun 1955.
- C. M. Shah, Construction and Standardisation of a test of Mechanical Comprehension for Stds. X & XI, begun 1955.
- M. G. Shinde, Compulsory Primary Education in Greater Bombay with special reference to the problems of Stagnation and Wastage, begun 1955.
- Kumari I. B. Tijoriwala, Reading and comprehension ability of Gujarati Children in the Age Group 14 to 16 years, begun 1955.

### **ENGLISH**

#### **Ph. D.**

- D. V. Jog, Aldous Huxley : The Novelist, begun 1955, likely to be completed 1959.
- D. G. Naik, Autobiography as a Form of Art, begun 1958, likely to be completed 1959.
- L. N. Bhagchandani, Realism and Romance in Shakespeare's Romantic Comedies, begun 1956, likely to be completed 1960.
- C. S. Raju, The Poetry of John Masefield—A Critical Study, begun 1957, likely to be completed 1960.
- D. K. Kulkarni, Nature and Development of the Personal Essay, begun 1958, likely to be completed 1960.
- P. G. Dhavale, The Element of Mystery in Short Stories (with special reference to English Short Stories), begun 1958, likely to be completed 1960.
- K. V. N. Swamy, Jawaharlal Nehru as a man of letters, begun 1958.

### **HISTORY**

#### **Ph. D.**

- R. S. Tiwari, Genesis of Anglo-Oudh Relations, begun 1954, likely to be completed 1959.
- B. M. Lalvani, India & the Persian Gulf during the time of the East India Company, begun 1954, likely to be completed 1959.
- Miss Dolly D. Deboo, The position of Zoroastrian Women in India and Iran begun 1954, likely to be completed 1959.

- Miss Sulochana Ramamurthy, The Genesis of the legislative machinery in India, begun 1955, likely to be completed 1959.
- Prof. A. Cherian, Impact of Islam on Indian Culture, begun 1955, likely to be completed 1959.
- Prof. B. K. Apte, Historiography in India, begun 1955, likely to be completed 1959.

## MUSICOLOGY

- Prof. B. B. Deshpande, Production of Indian Shrutees for a standard instrument, begun 1955, likely to be completed 1960.

## PHILOSOPHY

### Ph. D.

- R. K. Araokar, Implications of Society as an individual, begun 1954, likely to be completed 1959.
- R. A. Sinari, Contemporary Existentialism and its Limitations, begun 1954.
- Miss R. Shamala Sharma, Convergence of Modern Trends in Aesthetics towards individuation, begun 1956, likely to be completed 1959.
- K. Balakrishnan, The Onto Topical Significance of Evolution, begun 1957, likely to be completed 1959.
- D. G. Mathure, The Right and the Good at the Theoretical and the practical Aspects of Value, begun 1958.
- Ramachandra Mahadeva Bhawe, Feeling as an Existential Principle, begun 1958.

## SANSKRIT

### Ph. D.

- Venkatram S. Ayya, Kanya Literature, begun 1957, likely to be completed 1959.
- Miss Minakshi L. Dalal, Sanskrit Drama, begun 1958, likely to be completed 1961.

## URDU

### Ph. D.

- Miss Khairunnisa Rehnatulla Khan, Urdu Adab mein Tanz wa Zarafat (i.e. Humour and Satire in Urdu Literature), begun 1957, likely to be completed 1959.
- A. A. Kadiri, Urdu in Konkan, begun 1957, likely to be completed 1960.
- A. G. Shaik, Mirza Ruswa and his works, begun 1957, likely to be completed 1958.
- Zamiruddin Khan, The influence of Hindi poetry on Urdu poetry, begun 1958, likely to be completed 1960.

## SCIENCE

### Ph. D.

- Mrs. L. Keni, Further studies on *Semprula Maculata*, begun 1956.



**BIO-CHEMISTRY****Ph. D.**

- C. J. Mehta, Studies on the destruction of Vitamin and amino acids in complex mixtures, begun 1955, likely to be completed 1959.
- R. W. P. Master, Bio-chemical studies in *Nopalea Cochinellicifera*, likely to be completed 1957.
- Miss P. Y. Gaitonde, Studies in Human Milk, likely to be completed 1958.
- I. Arvindakshan, Studies on Enzymic components of snake venoms in relation to their action on tissue metabolism, begun 1957, likely to be completed 1959.
- V. D. Divekar, The chemistry of carcinogenicity of chewing tobacco, likely to be completed 1958.
- Miss D. S. Ghanekar, Bio-chemical studies on folic acid metabolism in animal and plant tissues, begun 1958.
- U. W. Kenkare, Studies on folic acid metabolism, begun 1957, likely to be completed 1960.

**BOTANY****Ph. D.**

- P. J. Dubash, Studies in germination of Indian Ruderal Plants, begun 1956, likely to be completed 1960.
- K. A. Shankarnarayan, Phytosociological and Ecological studies of the Grasslands of Bombay, begun 1953, likely to be completed 1957.
- Y. I. Selod, Physiological studies of Nitrophilous plants, begun 1954, likely to be completed 1958.
- R. P. Warick, Physiological studies in Halophytes, begun 1955, likely to be completed 1959.
- S. K. Wagh, Flora of Andhra State, begun 1956, likely to be completed 1959.
- K. C. Sheriar, Further studies on Nitrification and Nitrophily, begun 1956, likely to be completed 1959.
- C. B. Shah, Physiological studies of Nitrophilous plants, begun 1956, likely to be completed 1959.
- P. V. Rangnekar, Chromatographic studies of Organic acids and sugar in different halophytes, begun 1956, likely to be completed 1959.
- R. D. Bhonsale, Estimation on Organic acids in some of the Nitrophilous plants by paper chromatography, begun 1956, likely to be completed 1959.
- P. V. Bole, Flora of Mahabaleshwar, begun 1956, likely to be completed 1959.
- G. L. Shah, Flora of Sulsitte (Madhu Island), begun 1957, likely to be completed 1959.
- Kumari J. G. Iyer, Trace Elements, begun 1957, likely to be completed 1959.
- E. J. Lewis, Studies on Marine Algae, begun 1958, likely to be completed 1960.
- N. D. Kamat, Studies on Algae of Western India, begun 1957, likely to be completed 1960.
- R. H. Dani, Dielectric and semi conducting properties of Oxidic Semiconductors, begun 1958, likely to be completed 1961.

## CHEMISTRY

## D. Sc.

S. R. Patel,

Studies on double sulphates of certain metals, begun 1954, pub. in

- (i) J. of Amer. Chem. Soc.
- (ii) J. of University of Bombay.
- (iii) J. of Scientific or Industrial Research.
- (iv) Proc. Ind. Acad. Sc.
- (v) Current Science.

## Ph. D.

Dr. M. R. Soshi, Nutritive Value of Palm Gur.

Publications :

1. Availability of iron from Palm Gur and Cane Gur—pub. in J. Sci. Ind. Res. 15C, (1956), 272.
  2. Nature of Carbohydrates from Palm Gur—pub. in *ibid* 281.
  3. Minerals in Palm Gur—pub. in *ibid* 282.
  4. Vit B<sub>12</sub> and the alkali stable vit. B<sub>12</sub>-like factors in Palm Gur—pub. in *ibid* 16C, (1957), 68.
  5. Amino acid constituents of Palm Gur—pub. in *ibid*, 119.
  6. Biological availability of Riboflavin from Palm Gur— pub. in *ibid* 17C, (1958), 142.
  7. Research on Palm Gur—Tad Gud Samachar—2, (1956), 172.
- J. K. Bhambhani, Estimation of Serine residue in isoelectric proteins from potentiometric titration with orthophosphoric acid—Part I —Gelatin.
- G. H. Ahuja, Polarographic study of the reaction of metallic ions with Globin at various pH and temps. Part I—Cobalt, nickel, Zn, Col at pH 6.6 and temp. 37°C, pub. in Bom. Univ. Jour., 1958.
- B. G. Joshi, Studies in the behaviour of brass towards alkaline liquids, begun 1954, likely to be completed 1958.
- D. J. Mehta, Studies in some aspects of the Chemistry of Chlorites, begun 1954, likely to be completed 1959, Pub. in Proc. Ind. Acad. Sc. 1956, 44, 392.
- G. D. Pandit, Acylation of Baryl Glutaconic Anhydrides and Anils, Identity of L and Y positions of the Baryl Glutaconic Anhydrides and Anils, begun 1954, likely to be completed 1959.
- S. R. Iyengar, Studies in the corrosion of aluminium alloys in sea water, begun 1955, likely to be completed 1958.
- P. K. Kapadia, Studies in Sulphites of Uranium, begun 1955, likely to be completed 1959.
- V. S. Patil, Studies in lipids, begun 1955, likely to be completed 1958.
- K. S. Math, Studies in high polymers by scattering of light, begun 1956, likely to be completed 1958.
- Kumari P. A. Chikhalikar, Studies in Vitamin A, begun 1957.
- Kumari D. D. Vaghani, Studies in the synthesis of amino acids and some naturally occurring compounds, begun 1956, likely to be completed 1959.
- D. M. Phatak, Studies in Leucoanthocynins, begun 1956, likely to be completed 1959.

- C. R. Mundhe, Structural studies of Zincate crystals, begun 1956, likely to be completed 1960.
- A. S. U. Choughuley, New synthesis of folic acid, begun 1956, likely to be completed 1959.
- Mildred de Souza, Some reactions of Alizarin, begun 1956, likely to be completed 1959.
- Melchisedech S. Alvares, Reactions of U-amino-diphenyl-U-Sulphonic acid, begun 1957, likely to be completed 1959.
- John Misquitta, Acenaphthene Series, begun 1956, likely to be completed 1959.
- V. N. Kamat, Chemical investigation of medicinal plants, begun 1954, likely to be completed 1959.
- Shriram Sahadev Mungekar, Acylation and other reactions of 44'-dihydroxy-11' — dinaphthyl, begun 1954, likely to be completed 1959.
- Anthony Benedict Dias, Dyes from benzanthrone, begun 1954, likely to be completed 1956.
- Naval N. Katrak, N-p-phenetylamidines, begun 1954, likely to be completed 1956.
- A. S. Ghag, Evaluation of indigenous China-clays with respect to their reinforcing and other properties in rubber, begun 1958, likely to be completed 1961.

#### M. Sc.

- Hozy. K. Parekh, Action of formic acid on hair, horns and hoofs, studied by physico-chemical methods.
- R. Narayan Rao, Action of Iodine on  $\alpha$ -Cellulose under various Physico-chemical conditions.
- V. G. Sohoni, Reaction of (1) Orthophosphoric acid and (2) Glycero-phosphoric acid with isoelectric crystalline ovalbumin studied by physico-chemical methods :

### MICROBIOLOGY

#### Ph. D.

- C. V. Bapat, Effects of microbial and chemical agents on cancer and normal cells, begun 1953, likely to be completed 1959.
- Mrs. B. K. Batra, Effects of chemical carcinogen on hormones and heredity, begun 1954, likely to be completed 1959.
- H. M. Bhatia, Study of blood group substance H, begun 1955, likely to be completed 1958.
- Mrs. H. E. Doctor (Miss Pastakia, H. J.), Biological effects of radiation on epithelial cells, begun 1952, likely to be completed 1959.
- Mrs. S. M. Sirsat, Biological studies with the electron microscope with special reference to submucous fibrosis of the palate, begun 1955, likely to be completed 1958.
- Miss S. S. Waravdekar, Chemical Carcinogenesis, begun 1958, likely to be completed 1960.
- Miss G. C. Kothari, Microbial flore of Ice creams in Bombay, begun 1956.
- Kum. M. Savitri, Study of Adenoviruses in Tissue culture, begun 1958, likely to be completed 1959.

- Mrs. K. Sunder, Standardization of vaccine against influenza viruses, begun 1958, likely to be completed 1959.
- Miss B. D. Cucrava, A Contribution to the studies on antibiotic bact. from Indian soils, begun 1956 likely to be completed 1959.
- Joseph Martin D. Souza, A contribution to the studies on the antifungal antibiotics from Indian Medicinal plants, begun 1956, likely to be completed 1959.

## PHYSICS

### Ph. D.

- N. R. Gokhale, Rate of Evaporation of unattached water droplets, begun 1954, likely to be completed 1958.
- V. B. Kelkar, Elementary Particle Physics, begun 1957, likely to be completed 1960.
- S. D. Jog, Elementary Particle Physics, begun 1958, likely to be completed 1961. .
- K. H. Mariwalla, Elementary Particle Physics, begun 1958, likely to be completed 1961.

## ZOOLOGY

### Ph. D.

- Dr. V. C. Palekar, A study of the biology and fishery of *Sillago sihama* in the Bombay State, begun 1954, likely to be completed 1957.
- Miss A. C. Varkey, Cranial Muscles in Fishes.
- P. T. Muthe, Calcium Metabolism and Shell Secretion in Molluses, likely to be completed 1959.
- Miss S. Desai, Certain aspects of the anatomy and Physiology of aquatic insects, likely to be completed 1959.
- Mutsaddi, A study of the Gobioid fishes off Bombay, begun 1957.
- D'Mellow, Studies on preservation of fish, begun 1957.
- P. L. Sawant, Preservation and Nutritive value of fish, begun 1957.
- M. K. Thakur, Studies on prawns, begun 1956.
- M. J. Pradhan, Biology of some of the flat fishes of Bombay State, begun 1957.

### M. Sc.

- A. V. Kulkarni, Studies on alimentation and rate of digestion in some of the teleosts of Bombay, begun 1954.
- R. G. Dandekar, Thermal Tolerance of fishes, begun 1953.
- K. N. Sankoli, Intertidal Paguridae of Bombay, begun 1956, likely to be completed 1959.
- V. O. Kenikar, Study of islets of langerhans of some of the teleost fishes of Bombay Coast, begun 1957, likely to be completed 1959.
- Kum. R. B. Vasudeo, A comparative study of the digestive system of crabs of Bombay, begun 1957, likely to be completed 1959.
- Kum. P. M. Thakur, The biology and fishery of *Mugil dussumieri*, begun 1957, likely to be completed 1959.

# C E Y L O N

## Arts

### ARABIC

S. M. Yusuf,

The Revolt Against Uthman, published in the Islamic Culture, Hyderabad-Deccan, Vol. 27, No. 1.

A study in the Arab Mariners' accounts of their journey across the Bay of Bengal and the Gulf of Siam during the 9-10th centuries A.D. It is due to appear in the Islamic Culture Quarterly for April, 1955.

The Early Contacts between Islam and Buddhism to be pub. in the University of Ceylon Review for January, 1955.

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An article on the Architecture of Ceylon contributed to the Buddhist Encyclopaedia.

Eight chapters dealing with the history and civilization of Ceylon from the earliest times up to end of the Polonnaruwa period (approximately 200 pages) contributed to the University history of Ceylon (in the press.)

An article entitled "Some Regulations concerning Village Irrigation works in Ancient Ceylon" in Ceylon Journal of Historical and Social Studies, Vol. I.

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cultural Credit.

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Harold Feldman, Fulbright Professor.

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A study of child rearing practices and attitudes.

A study of the Inter-Personal Perception of Teachers and Pupils (in collaboration with Mrs. Margaret Feldman, Miss Sita Wickremasuriya and Professor T. L. Green).

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Feldman and Margaret Feldman, A study of Mental Hygiene Approach and the Project Method.

T. L. Green,

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T. R. A. Ruberu,

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S. Muthulingam, A study of the communication of scientific ideas among Ceylonese pupils in relation to the agents of communication and the social and cultural environment, work in progress.

A. Karunanandan,

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- H. A. Passe, The Use and Abuse of English, O.U.P., 1955
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- Ceylon Building Stones. Paper read before the Engineering Section of the C.A.A.S., Nov. 1954. Abstract published in the Proceedings of the Tenth Annual Session of the C.A.A.S., Colombo, Nov., 1954, Part I.
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- In Progress :  
 Atlas of Ceylon. (in collaboration with Dr. Macfadden and Mr. P. U. Ranatunge of the Survey Department).  
 The Geological Background of Ceylon History (in collaboration with Dr. D. N. Wadia), for the University History of Ceylon.
- G. J. Foster,  
 His investigations on the agriculture of Ceylon are progressing. He hopes to use the data collected for a Ph.D. thesis.

- W. P. T. Silva, Land utilization of the Kandy district.  
 H. N. C. Fonseka, Geography of the Kandy Region.  
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     Drainage anomalies in Central Ceylon, paper read before 45th Annual Session of the Indian Science Congress.  
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### HISTORY

- S. Mahendran, Anglo-French Relations in the Carnatic.  
 H. C. Ray, Foundation of Gupta Imperial Power in India and its relations with Ceylon  
 W. J. F. LaBrooy,  
     Ceylon Documents from 1833.  
     The Government of Ceylon 1832-1910—a history of the Civil Service, Judiciary, the rebellion of 1848, the Legislative Council, development of departments.  
 Rev. Fr. S. I. Pinto,  
     The sources of the history of the Portuguese period C. 1505—1660 A.D.  
     The Portuguese background.  
     Kotte and the Portuguese.  
     The rise of the Portuguese on the ruins of Kotte and Sitavaka.  
     The Portuguese and the Kandyan Kingdom.  
     Civilization of the Portuguese period (conjointly with Dr. K. W. Goonewardene).  
 D. P. Sinha,  
     Developments in Europe—Rise of Holland and other powers ; formation of English and French East India Companies.  
     Developments in Europe—Rise of the English and French as the chief rivals of the Dutch for eastern trade.  
     The South-Asian background c. 1832—1931.  
     The South and South-East Asian background c. 1931—1955.  
 L. S. Perera,  
     Sources of Ceylon History of the period up to 1505 A.D.  
     Early kings of Ceylon to the end of Mutasiva's reign.  
     The six Tamil kings (c. 433—460 A.D.).  
     The coming of the Moriyas—Dhatusena, Kasyapa, Mogallana etc.  
     Era of weak kings in Ceylon.  
     The change of capitals 1235—1412 A.D.  
     Rise of Dambadeniya, Gampola, Kotte and other principalities. 1412—1505 A.D.  
 K. W. Goonewardena,  
     The rise of seapower of Atlantic ports (15th Century).

Advent of the Portuguese in eastern waters in the reign of Vira Parakrama Bahu VIII.

The political conditions of Ceylon about 1505 A.D.—Kotte, Kandy, Vanni, Jaffna.

The Kotte kingdom.

Decline of Kotte and ascendancy of Sitavaka, Mayadunne and Rajasinghe I.

Circumstances leading to the use of the Kandyan kingdom : Vimala Dharma Suriya I, Senarat and the 1st part of Rajasinghe II's reign.

Arrival of the Dutch in eastern waters—early contacts with the Kandyan kingdom.

Decline and downfall of Portuguese power in Ceylon.

Civilization of the Portuguese period (conjointly with Fr. S. I. Pinto).

S. Arasaratnam,

The Portuguese and Jaffna.

The Dutch period (conjointly with Mr. J. H. O. Paulusz).

Miss S. Wickremasinghe,

Successors of Parakramabahu—the Kalinga princes ; Vijayabahu II, Mihindu VI, Nissankamalla, Virabahu I etc.

Temporary restoration of Sinhalese rulers—Lilavati, Dharmasoka etc.

Origin of Magha's power. His ultimate defeat and the fall of Polonnaruva.

H. C. Ray,

Work in connection with the second edition of the Dynastic History of Northern India and a third volume of the same work is continuing.

Work in connection with the Sanskrit Historical Mahakavya Sujana-carita is also progressing.

W. J. F. LaBrooy,

Read a paper on The Development of the Legislative Council of Ceylon before the Ceylon Political Science Association and printed in the Ceylon Economist, Vol. III, No. 3.

D. P. Sinha,

Compiling a volume of Indian Constitutional Documents (1600—1858) with Introduction and notes.

Working on the External Policy of Lord Auckland, Governor-General of India.

L. S. Perera,

Read a paper on The Use of source material in the Teaching of History in Schools at a Conference on the Teaching of History Organized by the Department of Education and the University, and published in the Ceylon Journal of Education, Vol. VI, No. 3.

K. W. Gunawardena,

Working on an article Robert Knox's writings on Ceylon for the University of Ceylon Review.

Writing an article for the Buddhist Encyclopaedia entitled History of Buddhism in Ceylon since 1500.

Doing some research for contribution to a work entitled Select Documents on the History of India and Pakistan to be published by the London School of Oriental and African Studies.



Contributed an article on Queyroz's Conquista to History, a journal in Sinhalese.

- S. Arasaratnam, Contributed an article Dutch Sovereignty in Ceylon : A Historical survey of its problems to Vol. I, No. 1 of the Ceylon Journal of Historical and Social studies.

W. M. K. Wijetunge,

Has made considerable progress on his post-graduate study, Some Aspects of the History of Ceylon from Vasabha to Mahasena.

Contributed an article entitled Decline and Downfall of the Kandyan King to a new journal in Sinhalese, History.

## **LAW**

T. Nadaraja,

The Japanese Shiho-Kenshu-Sho (Judicial Research and Training Institute) to be pub. in the Ceylon Law College Review 1955.

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Objectives in Legal Education, pub. in the University of Ceylon Review, 1956-57.

## **PALI AND BUDDHIST**

### **Civilization**

J. D. Dhirasekera,

Buddhaghosa and the Tradition of the First Council, to be pub. in University of Ceylon Review.

A new approach to the study of the ceremony and the text of Pat-mokkha in Pali.

### **Philosophy**

- A. K. Sarkar, The changing phases of Buddhist Thought. A paper read in one of the Seminars of the Indian Philosophical Conference.

K. N. Jayatilleke,

An Article on Meaning and Verification, published in the University of Ceylon Review, Vol. XIII, No. 1.

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- Miss Chandra Mudaliar, The State and religious endowments in Madras, begun 1958 likely to be completed 1960.
- Miss S. Saraswati, Minorities in the Madras State, begun 1958 likely to be completed 1960.
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- K. Kamalanathan, A history of the Council of State in India, begun 1955 completed 1956.
- Miss N. C. Shanta, Road administration in Madras 1800-1900, begun 1956 completed 1958.
- Miss Usha Murthy, Famine Relief administration in Madras, begun 1957 likely to be completed 1959.
- P. Viswanatham, Financial administration of the Madras Corporation, begun 1955 likely to be completed 1960.

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- Miss P. Rajalakshmi Varma, Behaviour problems in pre-school infancy, begun 1957 in progress.
- B. C. Muthaya, Relation between frustration tolerance and level of aspiration, begun 1957 in progress.
- M. A. Farooqi, Co-operation, competition and group structure, begun 1958 in progress.
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- Miss V. C. Vimala, Symbolism in South Indian marriage rituals, begun 1954 completed 1955.
- Miss P. Rajalakshmi Varma, Children's fears, begun 1955 completed 1956.
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- P. Balasubramanian, A study of the Literature of Tondaimandalam, begun 1957 likely to be completed 1962.
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- K. R. Nagaraja Rao, Further studies on systemic insecticides, begun in 1957, likely to be completed in 1959.
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- L. Saraswathi Devi, Physiology of host-parasite relationship.
- D. Subramanian, Fungal enzymes and plant wilts.
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- N. S. Gnanapragasam, Kinetics and mechanism of bromination of anisole with bromine and iodine bromide begun in 1957 and likely to be completed in 1959.
- R. Doraiswamy Iyengar, Chemisorption of hydrogen on Chromium Catalysts, begun in 1956, likely to be completed in 1959.
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- A. K. Kuriakose, Physico-Chemical investigations of the reactions between phenols and formaldehyde, begun in 1956, likely to be completed in 1959.
- P. Desikan, Vapour phase catalytic transformations of 3-carene, begun in 1956, likely to be completed in 1959.

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- V. A. Job, Kinetics of thermal decomposition of metal alkyls, begun in 1957, likely to be completed in 1960.
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S. Swaminathan and S. Sulochana, Synthesis of dl- $\alpha$ -amino- $\beta$ -(3-methyl-2-indole)-propionic acid, pub. in J. Org. Chem., 1958, 23, 90.

S. Swaminathan, S. Ranganathan and S. Sulochana, N-Mannich bases of 3-substituted indoles and alkylations with some N-indolylmethyl-trimethylamminium iodides, pub. in J. Org. Chem., 1958, 23, 707.

## PHYSICAL CHEMISTRY

### Ph. D.

S. Natarajan, Metabolic Activity of Soil Fungus, begun 1955, likely to be completed 1959.

I. M. Mathai, Kinetics of Bromine additions to saturated compounds, begun 1954, likely to be completed 1958.

D. Setu Rao, Dipole Moment Studies in relation to structure, begun 1955, likely to be completed 1959.

T. Devanathan, Studies in Intermolecular forces, begun 1955, likely to be completed 1960.

P. S. Radha Krishnamurthi, Structural and Solvent influences on some hydrolytic reactions, begun 1958, likely to be completed 1961.

H. Jayaraman, Studies in Oxidation, begun 1958, likely to be completed 1961.

### M. Sc.

A. V. Anantaraman, Kinetic Studies in Ester Hydrolysis, begun 1954, likely to be completed 1957.

B. Krishna Baliga, Kinetics of some hydrolytic reactions, begun 1955, likely to be completed 1958.

Alexander Samuel, Studies in Iyopoly and heteropoly acids, begun 1958, likely to be completed 1960.

## ENGINEERING

### Ph. D.

M. Maria Louis, Cross magnetic fields and their application to control purposes, begun 1958, likely to be completed 1963.

**M. Sc.**

- N. Subbian, The effect of the change in the Design parameters on the performance of polyphase induction motors, begun 1957, likely to be completed 1962.
- R. K. K. R. Govindarajan, Investigation of formulae for finding the correct number of buckets in the design of pelton wheel, begun 1957, likely to be completed 1962.
- P. C. Chandrasekaran, Amplidyne—Steady state and transient behaviour, begun 1957, likely to be completed 1959.

**ELECTRICAL**

- A. Srinivasan, Impulse testing of power transformers fault detection methods, begun 1954, in progress.
- K. M. A. Md. Sulaiman, Reluctance motors, begun 1956, in progress.

**PUBLIC HEALTH ENGINEERING****M. Sc.**

- S. Ranganathan, Studies on Madras City Sewerage System.
- M. Susikaran, Study of Environmental Sanitation conditions at the Engineering College Campus.
- V. S. Nanjundiah, Analysis of Refuse Collection and Disposal Practices in Madras City.
- R. Pitchai, An investigation into the waste treatment and disposal system of the King Institute, Guindy.
- R. Raman, Sewage treatment in anaerobic and stabilisation ponds.
- A. Ram Mohan, Studies on the intermittent and filtration of sewage.
- N. Murugappan, Studies on plumbing in relation to design aspects of pipe sizing.
- B. R. Amarshing, An investigation into the problem of waste disposal of Pallavaram tanneries, begun 1957, completed 1957.
- S. Balakrishnan, Methane recovery from manure, begun 1957, completed 1957.
- V. Rajagopalan, Studies on the intermittent sand filtration of sewage with anaerobic lagoon effluents, begun 1957, completed 1957.
- V. Raman, Electrical analogy method of analysing flows in water supply distributory networks, begun 1957, completed 1957.
- A. Sivaraman, Studies on operation of swimming pools in Madras City, begun 1957, completed 1957.
- T. G. Srinivasan, Removal of Fluorides from Water by Alkali digested alum impregnated paddy husk carbon, begun 1957, completed 1957.
- B. B. Sundaesan, An investigation into the pollution and capacity constant of Adyar River, begun 1957, completed 1957.
- Y. Suryanarayanamurthy, Aerobic composting of Garbage and Night soil, begun 1957, completed 1957.
- K. Purushothaman, Studies on stabilisation ponds, begun 1958, likely to be completed 1958.
- K. R. R. Pandian, Studies on Iron removal, begun 1958, likely to be completed 1958.
- S. Daivamani, Studies on settling of flocculent suspensions using water with alum floc, begun 1958, likely to be completed 1958.

- C. S. Kalyanasundaram, Studies on domestic filters and house-hold slow sand filters, begun 1958, likely to be completed 1958.
- R. Guruswamy, Studies on experimental flocculator using alum as coagulant, begun 1958, likely to be completed 1958.
- K. Chakrapani, Studies on septic tank performance, begun 1958, likely to be completed 1958.
- S. M. Shahul Hameed, Studies on infiltration galleries, begun 1958, likely to be completed 1958.
- S. B. Tagore, Studies on fluorine removal, begun 1958, likely to be completed 1958.
- Govindan Potti, Cooum River ; river pollution studies, begun 1958, likely to be completed 1958.
- R. Devarajan, Studies on experimental filter underdrains, begun 1958, likely to be completed 1958.
- S. A. Jagadeesan, Sludge digestion studies, begun 1958, likely to be completed 1958.
- S. Natarajan, Performance of intermittent sand filters, begun 1958, likely to be completed 1958.
- M. Vasappa Gowda, Composting of Municipal refuse, begun 1958, likely to be completed 1958.
- C. N. Nanjundappa, Fertiliser value of Sewage sludge, begun 1958, likely to be completed 1958.
- M. Thangaraj, Studies on trickling filters, begun 1958, likely to be completed 1958.

#### Ph. D.

- G. Ekambaram, Industrial Waste disposal in Madras State, begun 1957, likely to be completed 1960.
- R. Pitchai, Agricultural Utilisation of Sewage, begun 1958, likely to be completed 1960.

### GEOLOGY AND GEOPHYSICS

#### Ph. D.

- Dr. N. Leelananda Rao, Charnockites of the Type Area of Sir Thomas Holland, and Associated rock types, pub. in the Madras University Journal.
- Dr. S. Ramanathan, The relationship of the charnockites to the ultrabasic rocks in Salem (Madras State) and Dodkanya (Mysore State), pub. in the Madras University Journal.
- Samuel C. Jacob, The geology of the Western Ghats in the vicinity of Nagercoil, begun 1956, likely to be completed 1958.
- A. Dorairaj, Geology of the area around the South-Eastern flanks of the Kodaikanal Hills, begun 1957, likely to be completed 1960.
- N. Lakshminarayana Reddy, The Geology of the Calc-silicate rocks of Madukarai, begun 1957, likely to be completed 1960.

### MATHEMATICS

- A. A. Gnanadass, A General theory of cubic surfaces, and theories of polars with respect to cubic surfaces and with respect to the twisted cubic.

- Dr. V. K. Balachandran, Representations of lattices, pub. in  
 A characterisation of A-ring of sets—Fundm. Mathematica, 61.  
 A characterisation for complete Boolean algebra—Jour. Madras Univ., B. 24.  
 A mapping theorem for metric spaces—Duke Math. Jour., 22.  
 N. Sankaran, Immersion problems for near-rings.

### Ph. D.

- R. Venkataraman, Extension of the order and operational structure of the real continuum to non-enumerable limiting ordinals, begun 1957, likely to be completed 1959.  
 Miss Iqbal Unnisa, Modular lattices and their applications in Geometry, begun 1957.

### M. Sc.

- Gift Siromoney, Analysis of Time series with detailed application to the levels of water in the college wells and the correlation with rainfall.

## MEDICINE

- S. C. Devadatta, Professor of Bio-chemistry and others :  
 Isobutyl Alcohol acetic acid—Water mixture as a solvent for Amino Acids.  
 The Amino acids in the leaf of Azedirectha.  
 The effect of Prawn Proteins on the Bone of Mature rats.  
 Availability of Calcium in some of the leafy vegetables.  
 Choline content of some Indian Food stuffs.  
 Studies on the Nutrition of Urban Population groups.  
 B. R. H. Rao, Director of Rural Research Survey, (under Preventive Medicine Dept.),  
 Nutrition and Health Status Survey in Rural areas published in the Indian Journal of Medical Science.  
 Acceptability and reliability of foam tablets for population control in rural areas by Dr. (Mrs.) Gault and others and published in the Journal of Family Welfare.  
 General Health and Nutrition survey of the rural population in Pennathur village, published in the Indian Journal of Medical Sciences, Vol. 12, No. 9, September 1958, pp. 705-717.  
 R. H. Betts, Prof. of Thoracic Surgery, T. Thomas, N. Gopinath and others :  
 Resection in Basal Tuberculosis, pub. in Journal of C.M.A.I. 29, 8, 1954.  
 Some simple methods for Assessing Pulmonary Function—The Effect of Pulmonary Tuberculosis on Ventilation, pub. in Ind. J. Tub. 1, 69, 1954.  
 Decortication in Pulmonary Tuberculosis, pub. in Ind. J. Tub., 1, 62, 1954.  
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- Congenital Cyst of the Lung**, pub. in Indian Journal of Surgery, 17, 35, 1955.
- The Early Years of a Thoracic Surgical Service**, pub. in Indian Jour. of Surgery, 17, 193, 1955.
- Acute Tubular Necrosis of the Kidney after Pneumonectomy**, pub. in Journal Ind. Med. Association of India, 24, 8, January, 16, 1955.
- The Problem of Tuberculous Empyema**, pub. in The Journal of C.M.A.I., 30, 238, November 1955.
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- Experiences with Left Heart Catheterization.**
- Surgery of the Rheumatic Heart.**

**Ruth Myers, Professor of Bacteriology and others in the department :**  
**Antibiotic Sensitivity tests in Routine Diagnostic Bacteriology.**



- A comparison of V.D.R.L. Slide Flocculation and Kahn tests on one thousand routine specimens.
- Pulmonary Cryptococcosis.
- Haemolytic Streptococci in survey Throat cultures in an Indian Population with respect to Prevalence and Incidence of Antigenic groups in various age groups.
- Enquiry into the Virulence of Tubercle Bacilli Isolated from Tuberculosis patients before, during and after treatment with antibiotics.
- Studies on the Etiology of Diarrhoea in Children with particular reference to the Pathogenic Serotypes of *E. coli*.
- P. Koshy, Prof. of Medicine,  
Study on atherosclerosis : variations in cholesterol, lipoproteins and phospholipids and comparison with changes in blood transaminase.
- Radioactive Iodine for diagnostic and therapeutic purpose in Hyperthyroidism.
- D. M. Hancock, Professor of Surgery,  
Haemangioma of the Liver published in the Journal of the Royal College of Surgeons of Edinburgh, Vol. 3, pages 311-317.
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- Strongyloides infestation of the Jejunum, pub. in British Journal of Radiology, 1958, Vol. 31, page 102.
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- Recent Advances in Radiology of the Intestinal Tract, accepted for publication in the Journal of Christian Medical Association, January 1959 issue.
- Joy C. Paul, Junior Lecturer in Pharmacology :  
Anticonvulsant action on the electrical activity of epileptogenic discharging foci in the brain of man and macaca radiata mediata.
- Acetylcholine and adrenaline-noradrenaline sensitivity in denervated parotid gland of monkey, pub. in Indian Journal of Physiology and Pharmacology, Vol. 2, No. 3, pages 437-445, July 1958.

- C. Bhaktaviziam, Department of Skin & V.D., Neuro-Recurrence in early prenatal syphilis after inadequate penicillin therapy, pub. in Indian Journal of Dramatology & Venereology.
- D. Paranjothy, Associate Prof. of obstetrics & Gynaecology, Paper on Abnormal Pregnancy, read at the Medical Conference at Coimbatore on 21-11-1958 and to be published in the C.M.A.I. Journal and in the Indian Journal of Med. Sciences.
- J. Selvapandian, Re-constructive Surgery in Leprosy Hands—outlines of the disability of patients with paralysed hands due to leprosy and short review of operations done for this.
- S. J. Baker, Prof. of Medicine (Haematology), On Tropical Sprue Disorders.
- Mrs. S. Vaishnava, Junior Lecturer in Paediatrics. On Clinical aspects of Diarrhoeal diseases in Infancy and Childhood.
- X. J. Anklesaria, Junior Lecturer in Medicine, Histological changes in Rural diseases.
- B. K. Bachawat, Relationship of Vitamins B6 and Glutamic acid.

## NUTRITION

### M. Sc.

- Philomena Rayappa, Studies on the nutritive value of butter fat and oils as supplements to the 'Poor' Rice Diet of South India with special reference to Gingelly (Sesame) oil, begun 1956.
- Mary Jacob, A comparative study of the Basal Metabolic Rates of 73 South Indian and 93 Anglo-Indian girls from 9 to 16 years of age and the factors influencing these rates, begun 1957.
- M. V. Neela, Studies on the effect of Cooking, Storage and Dehydration on the Carotene content of some South Indian Vegetables, begun 1957.

## PHYSICS

- G. N. Ramachandran,  
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- V. Amirthalingam and G. N. Ramachandran, Structure of DL Aspartic Acid, pub. in Curr. Sci., 1955, **24**, 294.
- G. Krishnan, G. N. Ramachandran and M. S. Santhanam, Occurrence of Chitini in the Epicuticle of an Arachnid etc., pub. in Nature, 1955, **176**, 557.
- G. N. Ramachandran and K. S. Chandrasekharan, The Absolute configuration of Sodium Chloride, pub. in Acta Cryst., 1957, **10**, 671.
- G. N. Ramachandran and M. A. Lonappan, The Structure of High Temperature Potassium Chloride, pub. in Acta Cryst., 1957, **10**, 281.
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- K. S. Chandrasekharan,  
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- M. S. Santhanam, Studies on Cuticle of Orthropods, pub. in Proc. Ind. Acad. Sci., **A**, 1955, **42**, 142.
- V. Sasisekharan, An Application D-P method, pub. in Proc. Ind. Acad. Sci. **A**, 1956, **43**, 224.
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- C. Aravindakshan, A simple arrangement for obtaining optical transforms of crystal structures, pub. in J. Sci. Instrum. **34**, 250, 1957.
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- On the Molecular Distribution function of a one dimensional fluid II, pub. in *Phil. Mag. Sci.* 7, **45**, 1053, 1954.
- Studies on the Stochastic Problem of electron-photon cascades, pub. in *Proc. Theo. Physics*, Vol. 11, 95, 1954.
- Struggling of the range of fast particles as a Stochastic Process, pub. in *Proc. Ind. Acad. Sci.*, **41**, 202, 1955.
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- Two simple Stochastic Models of Cascade Multiplication, pub. in *Prog. Theo. Phys.* **11**, 595, 1954.
- Fluctuations in the Number of Photons in an Electron Photon Cascade, pub. in *Prog. Theo. Phys.*, **13**, 93, 1955.
- A Note on Cascade Theory with Ionisation loss, pub. in *Proc. Ind. Acad. Sci.*, **45**, 133, 1957.
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- S. K. Srinivasan and N. R. Ranganathan,  
 Numerical calculations on the New Approach to Cascade Theory I, pub. in *Proc. Ind. Acad. Sci.*, **45**, 69, 1957.
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- Alladi Ramakrishnan and R. Vasudevan, The Distribution of visible stars, pub. in Ap. J. **126**, 573, 1957.

During 1954-58 a Research Project entitled "A Study of the Primary Cosmic Radiation near the Magnetic Equator" was undertaken in this Department, with financial assistance from the Government of India Department of Atomic Energy. Nuclear Emulsions (imported from abroad as well as prepared in this Lab.) were sent up into the stratosphere with the help of rubber balloons. The recovered emulsions were processed at the Tata Institute of Fundamental Research, Bombay and were studied in detail for the relative abundance of charged particles in the primary cosmic radiation, by measuring the linear density of the delta rays in the tracks left by the particles in the emulsion.

A large number of pi-mu decays were studied in detail, and the ratio of the masses of the pi and mu mesons was calculated from grain density measurements made on the pi-mu decay tracks in the emulsion. The value obtained was in close agreement with values obtained by others.

A method was also developed in this Laboratory for preparing thick emulsions (upto 450 microns thick) for use in the study of cosmic rays, and small numbers of these emulsions have been processed quite successfully in this laboratory, using the refrigerator for temperature control at various stages of processing.

#### Ph. D.

- G. K. Ambady, Studies on Collagen, begun 1955, likely to be completed.
- N. E. Dweltz, X-ray studies of fibrous proteins, begun 1956.
- E. V. Krishnamurthy, Optical and X-ray Instruments, begun 1956.
- N. R. Ranganathan, Application of Stochastic Theory to Physical Problem, begun 1955.
- V. Sasisekharan, Structure of compounds related to Collagen and Nucleic acids, begun 1955, likely to be completed 1959.
- R. Srinivasan, The Structure of Amino acids and related compounds, begun 1955, completed 1958.
- S. K. Srinivasan, Some Physical Application of Random Functions and their Associated Integrals, begun 1954, completed 1957.
- Y. T. Thathachari, Studies on Collagen, begun 1955, likely to be completed 1959.
- K. Venkatesan, Elementary Particle Interactions, begun 1957.
- S. Venkataraman, Optical properties of proteins, begun 1956.
- R. Vasudhevan, Applications of Stochastic Theory to Physical Problems, begun 1956.
- S. Raman, Advanced Techniques in Crystal Structures Analysis, begun 1955, completed in 1958.

#### M. Sc.

- C. Aravindakshan, Crystal structure analysis, begun 1955 and completed 1957.
- S. Raman, X-ray studies of crystals, begun 1954, completed in 1955.

- M. Ranganathan, Advanced Techniques in X-ray crystallography, begun 1956, likely to be completed 1959.  
 G. S. Ramamoorthy, High Vacuum Technique.  
 A. Subramaniam, Frequency standards using quartz crystals (Wireless).  
 T. M. Swaminathan, Studies in Band spectra of diatomic oxides of... etc.  
 A. Venkatarangan, Studies in Microwaves region (Spectroscopy).

## PHARMACOLOGY

*Work completed and papers published :*

- (i) Aerosol Insulin inhalation Enquiry.
- (ii) Sensitivity of an indigenous Ophthalmic preparation containing Catechu, Turmeric and Cocconut oil on various laboratory animals.

*Work in progress :*

Effects of Oral Ant. Diabetic drugs on Experimental animals. This work will be completed within about 6 months.

All the above mentioned research work are being done not for submitting any thesis for higher degree like Ph.D., D.Sc., etc. and only for the sake of research.

## PHYSIOLOGY

- T. R. Krishnamurthy,  
 Achoris of Procain—some observations on animals of clinical value. 1951 to 1958.  
 Comparison of actions (other than antihistaminic), of some anti-allergic compounds. December 1955.  
 A preliminary note on the Pharmacology of Evolvine.  
 Some pharmacological actions of Evolvine hydrochloride.  
 Some pharmacological actions of an extract of olimum sanctum.  
 Local anaesthetic and anthelinintic action of olimum sanctum.
- Dr. N. Padmanabhan, Some adreno-cortical influences on skeletal muscle, begun 1954, a part of the above work has been completed and published in the Indian Year Book of Medical Sciences, 1958 (under print). Full work likely to be completed by end of 1959.
- K. Madhavan Kutty, Studies on experimental hypertension.  
 Padmanabhan,  
 Endocrinal influence on skeletal muscle.  
 Effect of ACTH on Adrenal Corticoids muscles.  
 Some adreno-cortical influences on skeletal muscle.
- Sarada Subramanyam and V. Vadana Rao,  
 Eio-Assay of Adrenal and adrenal in a fase of Pheocromocytoma, pub. in Indian Journal of Sciences.  
 Paper Chromatographic separation of Catechol Amines.  
 Effect of some commonly used analeptics on peripheral vascular system, begun 1955, likely to be completed 1956.
- Sarada Subramanyam,  
 B. P. Standards in South Indian subjects, begun 1954, likely to be completed 1955.

- Quantitative estimation of Pressor Amines 1955-56, begun 1955, likely to be completed 1956.
- For paper chromatography, vital capacity in South Indian subjects, 1955-56.
- Normal catechol amines excretion in 1955-56.
- South Indian subjects of different ages, 1955-56.
- Estimation of pressor amines in Bronchial Asthma and tropical eosinophilia, 1956 to 1957.
- Role of Nor-adrenaline and adrenaline in Toxemias of Pregnancy, 1956-57.
- Relationship between excretion of 17-Keto-steroids and catechol amines in Bronchial Asthma and Tropical eosinophilia.
- Study on the role of Catechol amines in hypertension, 1957-58.
- Detection of Isopropyl Nor-adrenaline in human urine, 1957-58.
- Effects of Ultra-arterial injection of procaine Hydrochloride in animals, 1957-58. Measurement of Cranial blood flow.
- Pressor amines in adrenal glands of cat. Detection of Isopropyl Nor-adrenaline, 1957-58.
- Effect of treatment with ACTH and Prednisone in Tropical Eosinophilia, 1957-58.
- E. C. G. changes in dogs after injections of catechol amines, 1957-58.

### STATISTICS

- Guy Pourcher, Worked on Demographic problems, begun 1955, completed 1957.

#### Ph. D.

- K. N. Venkataraman, Specification of suitable schemes for analysis of time series, begun 1955, in progress.
- Mrs. M. Krishnan, Studies in Statistical Inference, begun 1956, in progress.

#### M. Sc.

- Z. Govindarajulu, Correlation problems in non-normal populations, begun 1954, completed 1956.

### TECHNOLOGY

#### M. Sc.

- S. Hamsath Ibrahim, Study of the Principles and Technique of Electro Analytical Chemistry developed in recent years, begun 1954, completed 1956.
- B. Jagannadhaswamy, Studies on the Chemical Utilisation of South Arcot Lignite, begun 1954, completed 1956.
- N. Subramaniam, A critical study of the Instrumental Methods of Analysis of Metals, begun 1955, completed 1957.
- M. Ramanujam, Vapour Liquid Equilibrium Studies under the influence of salts and solvents, begun 1955, completed 1958.
- N. K. Raghavan, Heat Transfer through Packed Beds, begun 1956, likely to be completed 1959.
- Thomas Samuel, Phase equilibrium Studies in Liquid — liquid extraction, begun 1957, likely to be completed 1959.

- T. Sitaramayya, Mass transfer studies in liquid—liquid extraction, begun 1957, likely to be completed 1959.
- C. M. Lakshmanan, Studies in liquid—liquid extraction, begun 1957, likely to be completed 1959
- B. K. Sadananda Rao, Studies in Industrial Analysis, begun 1957, likely to be completed 1960.

## VETERINARY SCIENCE

### Ph. D.

- V. S. Alwar, Studies on *Trypanosoma evansi* — Parasitology, begun 1955, likely to be completed before 1960.
- K. P. Chandrasekharan, Studies on diseases of the liver in animals—Pathology, begun 1955, likely to be completed before 1960.

### M. Sc.

- D. A. Victor, Studies in host parasite relationships—Parasitology, begun 1955, likely to be completed before 1960.
- N. Narayana Rao, Ecological and Genital studies on *Drosophilae* of Madras, begun 1956, likely to be completed before 1961.
- B. Venkateswara Rao, Studies on Helminth Parasites of carnivorous mammals—Parasitology, begun 1956.
- K. T. Kunhikumaran Nambiar, Studies on the Haematology of the domestic fowl—Physiology, begun 1956, likely to be completed before 1961.
- V. Satchidanandam, Studies on the motility of the alimentary tract in the domestic fowl (*Gallus domesticus*) — Physiology, begun 1957, likely to be completed before 1962.
- I. M. Rodricks, Studies on the relation between ovarian activity and vaginal secretions in the Bovidae, begun 1957, likely to be completed before 1962.
- A. R. Vedanayakam, Studies on the Madras Market Milk—Animal Husbandry—Dairy Science, begun 1958, likely to be completed before 1963.
- R. Natarajan, A study of Pharmacology and Toxicology of *Gloriosa superba*—Pharmacology, begun 1958, likely to be completed before 1963.
- R. Venkatakrishnan, Studies on ensiling Napier Grass—Animal Nutrition, begun 1958, likely to be completed before 1963.
- R. Krishnan, Studies on Avian leucosis complex—Pathology, begun 1958, likely to be completed before 1963.
- V. K. Seshadri, Studies on the pulmonary lobulation in the Indian buffalo (*Bos bubalis*)—Anatomy, begun 1958, likely to be completed before 1963.
- A. Lakshminarasimhan, Studies on the sympathetic nervous system of the abdomen and pelvis of the Indian buffalo (*Bos bubalis*)—Anatomy, begun 1958, likely to be completed before 1963.
- P. S. Krishnamurthi, A study of the Indian Dairy products — Animal Husbandry—Dairy Science, begun 1958, likely to be completed before 1963.



- R. D. Michael, Study of Barn Hygiene under Indian conditions in relation to the production of clean milk — Animal Husbandry—Dairy Science, begun 1958, likely to be completed before 1963.
- Mostafa Farhangfar, Nutrition of young suckling calves — Animal Nutrition, begun 1958, likely to be completed before 1963.
- Srimathi C. M. Lalitha, Parasites of Poultry in Madras—Parasitology, begun 1958, likely to be completed before 1963.
- R. S. Patnaik, Effect of Fibre in the diet of young chicks and their nutritional resistance towards Coccidia — Animal Nutrition, begun 1958, likely to be completed before 1963.

## ZOOLOGY

### Ph. D.

- Dr. P. Rammohan Sarma, Studies on the free living nematodes of Madras, begun 1954, completed 1957.
- Dr. M. D. K. Kuthalingam, Feeding habits and life history of some Madras fishes, begun 1955, likely to be completed 1957.
- A. George Cherian, Studies on the Physiology of Anuran Respiration, begun 1954, likely to be completed 1958.
- Mrs. Sita Anantaraman, Studies on Helminth parasites of Madras, begun 1958, likely to be completed 1961.
- Mrs. Ruby Daniel, The Neurosecretory system of crustacea, begun 1956, likely to be completed 1959.
- P. K. Rajagopal, Studies on Madras Plankton, begun 1958, likely to be completed 1961.
- Miss Anna John Kottil, Studies on the Ciliates of Madras, begun 1958, likely to be completed 1961.
- Miss Mariamma Thomas, Studies on the cuticle of crustacea, begun 1958, likely to be completed 1961.
- O. Ramachandra Reddy, Physiological studies on Crustacea, begun 1958, likely to be completed 1961.
- E. Satyanarayana, Studies on the wood boring crustacea of Madras, begun 1958, likely to be completed 1961.
- S. Kannan,  
     Studies on the Root-Knöt Nematode. begun August 1955, completed in May, 1958.  
     Thesis not published.
- P. J. Sanjeevaraj, The Systematics and Morphology of leeches and some papers have been published.
- Kulkarni, The Peritrophic Membrane of Insects.

## **NAGPUR**

### **Arts**

### **ECONOMICS**

#### **Ph. D.**

- A. N. Lothe, Industrial Awards in India with special reference to Madhya Pradesh, begun 1954.
- K. S. Shrivastava, Trade Unionism and Industrial Disputes in Madhya Pradesh, begun 1954.
- K. R. Nanekar, The Handloom Industry in Madhya Pradesh, A study of its present Organisation : lines of future development, begun 1954, likely to be completed 1958.
- M. G. Kshirsagar, Economics of M. P. Finances during 1937-54, begun 1954.
- R. D. Mishra, The Problem of Direct Taxation in India during the period 1939-1954, begun 1954.
- G. P. Pimparkar, The Fiscal Policy of Madhya Pradesh in relation to its Economic Development, begun 1954.
- M. T. Pimprikar, An Investigation into some Co-operative Enterprises in the Agricultural Economy of the Cotton tract, begun 1954.
- S. A. Deshpande, Agricultural Planning in Madhya Pradesh, begun 1955.
- D. S. Kulkarni, Mortality rate of Industrial Enterprises in India, begun 1955.
- P. K. Fadnavis, The place of Orange Industry in the Economy of Madhya Pradesh, begun 1955.
- D. K. Sharma, Small Scale and Cottage Industries with special reference to Madhya Pradesh, begun 1955.
- L. Vishvanandam, Planned Economy and Co-operation in India, begun 1955.
- Kumari M. N. Chandrakantham, Structure and Organisation of the Textile Industry in India, begun 1955.
- V. Shivachandra Rao, Federal Finance and grants-in-Aid, begun 1955.
- D. G. Nandedkar, Industrial relations — Law in India, begun 1956.
- Ajit Mohan Sinha, Land Revenue and Settlement System of Madhya Pradesh under the British rule, begun 1958.
- J. Johnson, The Economics of Indian Rail Transport, begun 1958.

### **ENGLISH**

#### **Ph. D.**

- A. G. George, T. S. Elliot — His mind and Art, begun 1954, likely to be completed 1957.
- R. R. Khare, The Exotic Environment in Twentieth Century English Fiction with special reference to Somerset Maugham, begun 1955.
- K. K. Parulkar, The function and Technique of characterization in George Elliot, begun 1958.
- N. Laxminarayanasingha, Rudyard Kipling, The Story Teller, begun 1958.

**GEOGRAPHY****Ph. D.**

- N. G. Jain, *Agricultural Geography and Rural Economy of Cotton zone of Madhya Pradesh*, begun 1954.
- D. G. Narkhede, *The structural morphology of the West Coast of India*, begun 1955.
- J. P. Saxena, *Bundelkhand — a study in Economic Geography*, begun 1955.
- N. P. Meshram, *The Socio and Economic conditions of the Baigas of Madhya Pradesh*, begun 1955.
- Kumari Sheela Sundarlal Parashar, *Social Ecology of Baster District*, begun 1955.
- Kumari Shashikala Salve, *The changing boundaries of Gondwana in the present M. P. (Political Geography)*, begun 1955.
- Shankar Prasad Tiwari, *Economic Geography of Chhattisgarh*, begun 1956.

**HINDI****Ph. D.**

- Shrimati Kiron Jain, *Madhyakalin Hindi Sahitya Me Radha (1600-1700) (Conception of Radha in Hindi Literature of Mediaeval Period)*, begun 1954.
- K. K. Shrivastava, *Influence of Physical Sciences on Hindi Literature*, begun 1954.
- R. C. Gangrade, *The Saint of Nimar—"Singazi"*, begun 1954.
- Kumari Usha Belapurkar, *Comparative study of Modern Hindi-Marathi Poetry*, begun 1954.
- Yasho Vimalanand, *Hindi Sahitya Me Bal Manovigyan*, begun 1954.
- M. K. Baitule, *The Comparative Study of Jaya Shankar Prasad and Khadilkar as respectively Hindi and Marathi contemporary and Epoch-making Dramatists*, begun 1954.
- I. Panduranga Rao, *Hindi Aur Telugu Ka Natak-Sahitya Tulanatmak Adhyayan*, begun 1954.
- B. L. Jha, *Halbi Bhasha Aur Lok Sahitya*, begun 1954.
- Vidya Bhushan Gangal, *Madhya Yageen Aur Adhunik Hindi Kavita Me Per Paudhe Aur Pashu-Pakshi*, begun 1954.
- Rajmal Jain, *Adhunik Hindi Kavita (1925-50) Ka Manovishleshanatmak Adhyayan*, begun 1954.
- Gyanendra Saksena, *Co-operative and Critical study of Hindi and Marathi Novels (1900-1954)*, begun 1954.
- Tej Narayan, *Study in Maithili Folk Songs*, begun 1954, completed 1957.
- Kumari Leela Awasthi, *Adhunik Natakon Men Nari Chitran*, begun 1954.
- S. J. Majithia, *Madhyakalin Hindi aur Panjabi Santo Ki Rachnaon Ka Tulnatmak Adhyayan*, begun 1955.
- S. P. Tiwari, *Contribution of Marathi Saints to Hindi Literature*, begun 1955.
- Ganesh Datta Tripathi, *Madhyakalin Hindi Kavita Me Nayekachitran*, begun 1955.

- G. N. Gupta, *Madhyakalin Hindi Aur Marathi Kaviyon Ka Tulnatmak Adhyayan*, begun 1955.  
 L. P. Misra, *Aadhunik Hindi Upanyason Ka Pravritti Vikas (1920-1954)*, begun 1956.  
 S. N. Sesh, *Hindi Aur Marathi Katha Sahitya Ka Tulnatmak Adhyayan*, begun 1956.  
 Udaya Raj Upadhyaya, *Meera : Her Life, Philosophy and Work*, begun 1956.  
 B. S. Shadangi, *Bhikaridas*, begun 1956.

## HISTORY

### Ph. D.

- M. B. Deopujari, *Shivaji and the Maratha Art of War* begun 1954, completed 1957.  
 Balchandra Jain, *Studies in Madhya Pradesh Numismatics (Neo-Mohammedan) or the Archaeology of Madhya Pradesh*, begun 1955.  
 P. D. Browne, *India's Freedom Struggle*, begun 1955.

## MARATHI

### Ph. D.

- R. B. Dokey, *Marathi Vinodi Var-Gamyateel Antah Pravritti*, begun 1954.  
 G. M. Dolke, *Philological study of Halbi*, begun 1954.  
 V. K. Warhadpande, *Study of Bahmini-Marathi Language with special reference to Eknath*, begun 1954.  
 M. M. Kaned, *Arvachin, Marathi Kavyantee Prem Mimansa*, begun 1955.  
 B. P. Moharil, *Arvachin & Va-Hadi Boliche Bhasha Shastriya swarup*, begun 1955. (*Philosophical aspects of Berari Dialect*).  
 M. R. Karandikar, *Shreepad Krishna Kolhatkar Sahitya Ani Sampradaya*, begun 1955.  
 R. P. Pajankar, *Kai. Gadakarayanchya Natakanteel Istrisrishti-Shri B. S. Pandit*, begun 1955.  
 M. N. Lohi, *A close critical study of the contemporary Marathi short story of the last decades (1945-1955)*, begun 1956.  
 R. B. Shewalkar, *Aesthetics and Modern Marathi Poetry*, begun 1956.  
 M. S. Wabgaonkar, *The Impact of Gandhian Thought on Modern Marathi Literature (The Impact of Gandhian on Marathi Literature)*, begun 1958.  
 S. K. Kalnawat, *Varerkaranchya Nayika Shri Bhargavram Viththal Uri Mama Varerkar Yanchya Nayika*, begun 1958.  
 B. M. Mandaokar, *Marathi Santa Ani Chaturvarnya*, begun 1958.  
 S. P. Mankikar, *Influence of V. D. Savarkar's Literary Personality on Marathi Literature with special reference to Diction, epic form of Poetry and the Rhetoric element in style*.

## MUSIC

### Ph. D.

- Arun Kumar Sen, *Bharteeya Talonka Shastriya Vivechan with comparative study of South Indian Talas*, begun 1954.

**PERSIAN AND ARABIC****Ph. D.**

Taiyib Ahmad, Persian Poetry of the Early Urdu Poets, begun 1956.

Mohd. Abdul Q. Khatib, Sharar—Life and Works, begun 1957.

Ashiq Husain Salesh Bhai, Al-Manyyed Fid-din Al Shirazi, begun 1958.

**PHILOSOPHY****Ph. D.**

Kumari Krishna Guha Thakurta, The Problem of Unconscious in Freudian and Yoga Psychology, begun 1954.

D. D. Bandiste, (i) Indian Ethical Theories or (ii) The ethics of the Gita, begun 1955.

Kumari Maithili Raghavan, Gandhian Conception of Social Order and Communism, begun 1955.

H. L. Chati, Concept of the World in Indian Philosophy, begun 1956.

Kumari S. Raghavan, The Gandhian Conception of Religion, begun 1956.

B. R. Purohit, Hindu Revivalism and its influence on the Development of Indian Political Thought from 1800-1947, begun 1956.

N. N. Shrivastava, The rise and growth of Arab Nationalism and its repercussion on West Asian Politics since World War II, begun 1956.

K. R. Singh, The rise and growth of Nationalism and Independence.

**POLITICAL SCIENCE****Ph. D.**

P. S. Dhagat, Organisation of Group Life through the Co-operative Movement, begun 1954.

S. C. Gangal, The Gandhian Way to World Peace, begun 1954.

S. L. Tiwari, History of the Working of Dyarchy in Madhya Pradesh, begun 1954.

B. K. Shukla, Socio-Political Development of the Aborigines of Madhya Pradesh (A study in Cuttuke contact), begun 1954.

P. Sen, Religious Festivals of the Hindus in Mahavidarbha (An anthropological study), begun 1954.

K. V. Umre, Administration of primitive Justice among the aborigines of Madhya Pradesh, begun 1954.

P. G. Muley, Social Stratification in the Urban Community of Madhya Pradesh, begun 1954.

Shrimati Tara S. Shastri, Growth and Development of the Cabinet System of Government and its working in Madhya Pradesh from 1919 to 1954, begun 1954.

M. S. Gupta, Civil Liberty in India since 1937, begun 1954.

R. V. Ranade, Pressure Groups in Indian Politics with special reference to post-Independence period, begun 1955.

J. H. Chinchalkar, A social study of Korwas in the Sarguja and Raigarh District, begun 1955.

Tolaram Lunawant, Juvenile Delinquency in the City of Nagpur, begun 1955.

- S. R. Nanekar, British Foreign Policy after the Second World War (1946 to up-to-date), begun 1955.
- Anil Kumar Saha, The foreign policy of United States in relation to the Far East from 1900 to the present day, begun 1955.
- J. C. Nemawarkar, A study of the Development and working of Delegated Legislation and Administrative Adjudication in Madhya Pradesh since August 1914, begun 1955.
- Brahmakumar Shukla, Socio-Political Development of the Gonds of Satpura Plateau (a study in Culture Contact and Change), in place of Socio-Political Development of the Aborigines of Madhya Pradesh, begun 1955.
- M. C. Choubbe, Political History of the Choulukyas of Gujarat in place of Political History of Bundelkhand from C. 800 to C. 1200 A.D. (approved by the Academic Council on 8th December, 1949), begun 1955.
- Kumari P. R. Pendharkar, Middle Class in Urban Areas (A Sociological Study), begun 1956.
- B. R. Purohit, Hindu Revivalism and its influence on the Development of Indian Political Thought from 1800-1847, begun 1956.
- N. N. Shrivastava, The rise and growth of Arab Nationalism and its repercussion on West Asian Politics since World War II, begun 1956.
- K. R. Singh, The rise and growth of Nationalism and Independence Movement in North Africa, begun 1958.

## PSYCHOLOGY

### Ph. D.

- Kumari Jane George, Dynamic need structure of the School going teenagers, begun 1956.

## PUBLIC ADMINISTRATION AND LOCAL SELF-GOVERNMENT

- K. Satyanarayan Rao, Administration of Laws and Schemes relating to the Improvement of the condition of the Agricultural Classes in Madhya Pradesh, begun 1954.
- V. S. Murti, Some Problems of Social Administration in India, begun 1954.
- Yogendra Misra, Administrative regulation and control of the exploitation of Mineral Resources with special reference to Madhya Pradesh, begun 1954.
- V. M. Sinha, The Re-organisation of the Civil Services in India, begun 1954.
- Kumari S. C. Deshmukh, Educational Administration in Local Bodies with Special reference to Madhya Pradesh, begun 1956.
- E. H. Valsan, Community Projects and National Extension Services Administration in India with special reference to Madhya Pradesh, begun 1956.
- K. M. Mathew, Panchayat Administration in Travancore-Cochin State, begun 1956.
- T. V. Raghavan, Railway Services in India, begun 1956.

- S. Panduranga Rao, The Problems of the Municipal Executive in India with special reference to Municipalities in Andhra and Madhya Pradesh before re-organisation, begun 1956.
- Kumari Usha G. Mohoni, Administration of Schemes for the rehabilitation of the Physically handicapped persons in the Modern States with special reference to India, begun 1956.
- P. R. Haridas, Administration of Medical Department with special reference to Madhya Pradesh before the re-organisation, begun 1956.
- C. Rabindranath, Personnel Administration in India between 1857 and 1947, begun 1958.

## SANSKRIT

### Ph. D.

- B. R. Ashtikar, The Development of Dhavani Theory and its after effects, begun 1954.
- S. B. Warnekar, A critical study of the Literary Works in Sanskrit produced during the last three centuries, begun 1954.
- S. P. Hirelkar, Kavyalok Athva Kavyanandachi Mimansa (New Perspective of Sanskrit Sahitya Shastra), begun 1954.
- K. V. N. Appa Rao, Sanskrit Metres in their Historical Development, begun 1954.
- S. K. Limaye, Influence of Mimansa rules of interpretation (Nyaya) on five commentators of Dharmashastra, viz. — (i) Vishvarup; (ii) Meghatithi; (iii) Vigyaneshwar; (iv) Aprark; (v) Jecmatvahan, begun 1954.
- G. S. Tripathi, Aborigines in Vedic Literature, begun 1954.
- S. A. Dange, A critical study of the Folk-tales and legends in Mahabharat, begun 1955.
- V. P. Johrapurkar, History of the Bhattaraka Tradition, begun 1956.
- N. V. Hardas, Literary Criticism in Sanskrit in the part Mammata, period with special reference to the work of Jagannath Pandit, begun 1958.

## URDU

### D. Litt.

- Dr. G. M. Khan, Halika Zahmi Irtika, Farsi Par Urdu ka Asar, Ilmi Nukush.

### Ph. D.

- Shrimati Qutbunnisa Begum Hashimi, Urdu Safar Namas, begun 1954.
- A. C. Sharma, A Historical and Critical Survey of Rabaiyat in Urdu, begun 1956.
- Manza-Ur-Rehman Khan, Letter writing in Urdu—its history and Literary Value, begun 1957.
- H. K. Azar, Urdu Shairy Aur Tasawoof, begun 1957.
- M. Hanif M. Hussain, Urdu Men Ukhalauki Shaeri, begun 1957.

**Science****BIO-CHEMISTRY****Ph. D.**

- R. M. Behki, Studies on the Physiological — Significance of condensation on Product of glucose and Aceatoacetate, begun 1955.  
Tetrahydroxy Butyl, 5-Methyl, 4-Carbethoxy Furau.
- S. Ganeshdas Naydu, Metabolic disturbances induced by acetoacetate with special reference to its effect on the Adrenals, begun 1955.
- D. B. Motlag, Studies on the Metabolic role-played by Ayurvedic Calcium preparations, begun 1955.
- E. P. Madhava Bhattathiry, Studies on Alloxan Diabetes and its Prevention, begun 1955.
- J. M. Khanade, Studies on Ketogenesis and Antiketogenesis, begun 1956.
- Anwaruddin Saikia, Studies on Lipid Metabolism with reference to experimental Atherosclerosis, begun 1958.
- M. L. Belkhode, Studies on the Bio-Synthesis of Ascorbic Acid, begun 1958.
- P. S. V. Ramanna Murthy, Studies on Energy Metabolism, begun 1958.

**BOTANY****Ph. D.**

- J. N. Dwivedi, Fossil Plants from Madhya Pradesh, begun 1954.
- V. N. Gadgil, Bio-Chemical Studies of differentiated, begun 1954.
- Laxmichand Singhai, Studies in the Deccan Inter trappean Flora (Palaeobotany), begun 1955.
- K. M. Munshi, Fossil Plants in Madhya Pradesh, begun 1955.
- M. Raghu Ram Rao, Contributions to our knowledge of the Deccan Inter trappean Flora, begun 1956.
- P. K. Mukherjee, Morphological and Embryological studies in the Euphorbiaceae and Species of Polygal Ionidium and Caesalpinia, begun 1957.
- M. V. Mirashi, Studies in Some Indian Hydrophytes, begun 1957.
- P. K. Deshpande, Studies in the Embryology of some sympetalous Families of Flowering Plants, begun 1957.
- Kumari L. J. Shallom, Contribution to the knowledge of the Deccan Inter troppean Flora, begun 1957.
- M. D. Padhya, Embryological Studies in the Cyperaceae with some observations on the Embryology of Passiflora Foetida, begun 1957.

**CHEMISTRY****Ph. D.**

- Indra Deo Singh Arya, Anodic Phenomena in the Electrolysis of the silver salt, begun 1954.
- Kumari S. Kameshwary, Physico-Chemical studies in Catalysis, begun 1954.
- G. Bagvant, Investigations on Mechanism of some Reactions, begun 1954.
- B. V. Dhareshwar, New Techniques in Chromatography and its applications, begun 1955.
- S. V. Soman, Studies in Bacterial Absorption, begun 1956.



**GEOLOGY****Ph. D.**

- A. S. Dave, Study of the non-opaque Manganese Bearing minerals associated with Rocks of the Sansar Series of Madhya Pradesh, begun 1959.

**MATHEMATICS****Ph. D.**

- Altaf Ali, Theory of Functions, begun 1955.

**PHYSICS****D. Sc.**

- S. Pancharatnam, The Optics of Crystalline Media, begun 1957.

**Ph. D.**

- M. G. Kelkar, Studies of electric discharge as affected by light irradiation and under X-rays, begun 1955.  
 V. G. Ayachit, Studies in Electrical discharge as affected by X-rays, begun 1955.  
 R. N. Bapat, Molecular Structure of Organic Compounds by Spectroscopic methods, begun 1956.  
 P. V. Khandekar, The study of Semiconducting properties of Natural Sulphide Ores, begun 1956.  
 J. N. Das, The Study of the Semiconducting properties of Pyrolusite and other Semiconductors, begun 1956.  
 A. C. Chakradeo, Joshi, Effect under various Parameters, begun 1958.  
 W. G. Nafde, Optical Studies on some aspects of Crystal Growth, begun 1958.  
 V. L. Lokre, Characteristics of the ionosphere over Nagpur, begun 1958.

**ZOOLOGY****Ph. D.**

- K. R. Ramaswamy, Sex cycle in bats of Madhya Pradesh, begun 1954.  
 B. S. Jangi, Studies on the Morphology Reproduction; and Ecology of the Centipede Scholapendra Morsitans Linn, begun 1955.  
 K. S. Deshpande, Studies on the reproduction of the Common Muskshrew—Duncers Murinus Linn, begun 1955.  
 V. K. Thakre, Studies in the Biology, Ecology and Anatomy of an Indian Gryllid (Gryllushimaculatus be Geer) Cryllidae Orthophera, begun 1956.  
 E. B. Balsara, Studies on the Morphology, Ecology, and Life History of Gerris Nepalensis (Dist.), begun 1957.  
 Kumari S. G. Hardas, Morphology Life History and Biology of Labidyra riparia Pallas, begun 1958.

## **OSMANIA**

### **Arts**

#### **ENGLISH**

##### **Ph. D.**

- B. N. Joshi, Aldous Huxley—An Interpretation, begun 1954.  
M. S. Samuel, Spencer's Influence on Milton, begun 1955.  
M. Naimuddin Siddiqui, The Secular Poetry of John Donne, begun 1955.

#### **MARATHI**

##### **Ph. D.**

- S. R. Kulkarni, Bhagwath Dharma, As propagated by Eknath, begun 1954, completed 1956, published by Eknath Samshadhan Mandir, Aurangabad in 1958.

#### **PERSIAN**

##### **Ph. D.**

- Gulam Dastagir Rasheed, The Development of Naatia Poetry in Persian Literature, begun 1958.  
Sharufur Nisa, Life and Works of Abu Talib Kaleem, begun 1958.

#### **TELUGU**

##### **Ph. D.**

- B. Ramaraju, Telugu Folk Songs, published by the Author himself at Hyderabad in 1958.  
D. Venkatavadhani, The beginnings of Telugu Literature with special reference to Nannaya Bhatta, begun 1957.

#### **PHILOSOPHY**

##### **Ph. D.**

- Venkat Kishen, The Conception of Salvation in the Philosophy of Schopenhauer.  
Miss A. M. Nasira, The Naqshbandia System of Sufism.  
V. Madhusudan Reddy, The Concept of Evolution in the Philosophy of Sri Aurobindo and the Problem of Human Destiny.

### **Science**

#### **CHEMISTRY**

##### **Ph. D.**

- C. V. Ratnam, Studies on the formation of heterocyclic rings from o-Phenylenediamine and aromatic aldehydes, begun 1954.

## CHEMICAL TECHNOLOGY

### Ph. D.

- Eshwar Rai Suxena, Extraction of Potash from Felspar, begun 1955.
- M. Abdul Waheed, Effect of Organic solvents on the conductivity of aqueous solution of strong acids, begun 1955.
- Miss Akhtar T. Mahajir, Preparation of Phosphatic fertilizers with a view to conserving sulphuric acid, begun 1955.
- Miss Razia Osmani, Utilization of Alkali and Alkaline earth sulphate for the production of sulphur dioxide, begun 1955.
- K. N. Murthy,  
Utilization of iron pyrites.  
Dicalcium phosphate and glue, from bones, begun 1953.
- Sham Rao Nandapurkar, Studies on heat transfer during the condensation of saturated vapours, begun 1956.
- Balbheem Rao, Studies of Hyderabad clays, begun 1956.
- Raj Naidu, Studies on indigenous vegetable oils of Hyderabad State, begun 1958.
- K. Ramalingam, Studies on solvent extraction of vegetable oils, begun 1956.
- T. L. Narasimha Rao, Active carbon from indigenous materials, begun 1957.
- V. V. R. Subramaniam, Analysis and separation of fatty acids, begun 1957.
- Athota Venkata Rajeswara Rao, Studies of mineral constituents of Hyderabad clays by differential thermal analysis and other methods.

## GEOLOGY

- S. Balakrishna, Physical properties of rock and their relation to Geological features, begun 1955.

## MATHEMATICS

### Ph. D.

- V. Lakshmikantham, Studies in the theory of non-linear differential equations, begun 1955. The following papers which form a part of the thesis have been published :
- On the boundedness of the solutions of differential systems, pub. in Proc. of the Amer. Math. Soc., 1957.
- Some asymptotic problems of solutions of differential systems, pub. in Proc. of the Nat. Acad. Sc. (India), 1958.
- Non-linear deformation of anisotropic bodies, pub. in Proc. of the Theoretical and Applied Mechanics, 1957.
- B. Kesava Rao, Relaxation methods and their applications to non-linear differential equations, begun 1956, likely to be completed 1960.
- S. Leelamma, Differential equations—periodic solutions of, begun 1957, likely to be completed 1961.
- Wazirunissa, Modern Algebra, begun 1957, likely to be completed 1961.

**PHYSICS****Ph. D.**

- M. Ramakrishna Rao, Light scattering and viscometric behaviour of some polymer systems, begun 1954, completed 1957.
- B. K. Goswami, Photoelastic dispersion in crystals, begun 1954, completed 1958.
- M. B. K. Sarma, Investigations on the spectra produced by high voltage condensed discharges, begun 1954, completed 1957.
- S. M. Alladin, Solar dynamics, begun 1955, likely to be completed 1959.
- V. S. Raghavendra Rao, High Polymers, begun 1955, likely to be completed 1959.
- Dinker S. Deshmukh, X-ray crystallography, begun 1957, likely to be completed 1959.
- Mudholkar, X-ray crystallography, begun 1957, likely to be completed 1959.
- R. Thyagarajan, Spectroscopy, begun 1957, likely to be completed 1959.
- K. Venkatramiah, Raman and Infra-red Spectroscopy.
- Miss Lalitha Ramaswamy, Molecular spectroscopy, begun 1958, likely to be completed 1960.
- E. Venkateswara Rao, Emission spectroscopy of heavy molecules, begun 1958, likely to be completed 1960.
- V. G. Krishnamurthi, Photoelasticity of crystals, begun 1958, likely to be completed 1959.
- E. Srinivasachary, Ultrasonic relaxation in organic vapours, begun 1958, likely to be completed 1960.
- M. Suryanarayana, Ultrasonic studies in chemically active liquid media, begun 1955, completed 1958.

## **PATNA**

### **PHILOSOPHY**

#### **Ph. D.**

Miss Uma Gupta, Indian Materialism, begun 1957, likely to be completed in 1960.

Ram Mohan Singh, A Critical Study of Ethical Naturalism, begun 1957, likely to be completed in 1960.

Pabitra Kumar Roy, The Influence of the Upanisads and the Vedanta on Modern Indian Thought, begun 1958, likely to be completed 1960.

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# RESEARCH INSTITUTES

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# **BHANDARKAR ORIENTAL RESEARCH INSTITUTE**

## **SANSKRIT**

### **Ph. D.**

- V. P. Mahajan, Ksemendra : An author study.  
Mrs. S. V. Oka, A survey of Gītās in Sanskrit Literature.  
V. T. Zambare, Rājaśekhara : A Critical Study.  
C. R. Deshpande, Studies in Campu Literature.  
Jikido N. Takasaki, A Study on the Ratnagotra-Vibhaga (Uttaratantra)  
being a treatise on the Tathāgatagarbha-Theory of Mahāyāna  
Buddhism.  
R. L. Joshi, Vācaspatimiśra : A study.  
K. S. Nagarajan, Contribution of Kashmir to Sanskrit Literature.  
Mrs. M. Gokhale, Miscellaneous works of Śāṅkara.  
M. G. Kothari, Critical study of Tattvārthas' lokavārtika.  
C. T. Kenghe, Survey of Sāṃkhya Philosophy before Īśvarakṛṣṇa.  
Mrs. Prabhavati R. Joshi, Saṃkṣepa'sārīraka.  
W. R. Antarkar, Śāṅkaradigvijaya.  
Mrs. Gita L. Gadre, Advaitasiddhi.  
G. H. Taralekar, Studies in Nāṭyaśāstra with special reference to the  
staging of Sanskrit Drama.  
Miss E. H. Roderigo, Heroic Drama Age.  
J. N. Kshirasagar, The Critical Study and Appreciation of Pārśvābhyu-  
daya by Jināsena and the Jain texts.



## BOSE INSTITUTE, CALCUTTA-9

### Biochemistry

#### Plant Bio-Chemistry

- Miss Susweta Sen, Biochemistry of Phosphorus Absorption in Roots of Higher Plants, begun 1961, likely to be completed 1963.
- Miss Latika Danda, Glycolytic Enzymes in Higher Plants, begun 1960, likely to be completed 1962.
- Dr. Vidyadhar Nilkanth Gadgil :
- Crown Gall Problem. I. *In Vitro* Culture of Bacteria-free Crown Gall Tissue, begun 1953, completed 1960.
  - Crown Gall Problem II. Comparative Biochemistry of Crown Gall Tissue, begun 1961, likely to be completed 1964.
  - Studies on Crown Gall Tumour, Part I to IV, pub. in Trans. Bose Res. Inst. Vol. 24, 1961, (in press).
- Dr. (Mrs.) Madhuri Roy (nee Dutta), Phosphorus Metabolism in higher plants, begun 1954, completed 1957.
- Dr. Sudhansu Kumar Roy :
- Phosphorus Metabolism in Higher Plants, begun 1952.
  - Crown Gall Problem, begun 1952.
  - Glycolytic Enzymes in Higher Plants, begun 1952.
  - Biochemistry of Phosphorus Absorption in Roots of Higher Plants, begun 1952.

### Botany

Mridula Datta :

- Investigations on the free dividing nuclei of Palmae endosperm, begun 1955, completed 1960.
- Dividing nuclei in coconut milk, pub. in Nature Vol. 177, pp. 799-781. 1953.
- The occurrence and division of free-nuclei in the endospermal milk of some Palmae, pub. in Trans. Bose Res. Inst. Vol. 19, pp. 117-126 : 1955.
- The effect of Light on the mitotic spindle : pub. in Experimental Cell Research, Vol. 21. pp. 261-273. 1960.

#### Botany (Cytogenetics)

Rabindra Krishna Basu :

- Effect of X-rays and radio isotopes on jute, begun 1950 completed 1959.
- Induced mutation in paddy with  $P^{32}$  and  $S^{35}$ , begun 1955.

D. N. Chakraverti :

- Effect of ionising radiations on ultimate fibre cells of Jute, begun 1951, (in progress).
- Leaf teratology in *Nyctanthes arbor-tristis* Linn, begun 1952.

Amiya Kumar Adhikary :

Hybridisation works and genetical studies in cotton, begun 1954, to be completed 1957.

Cytological, cytotaxonomical and cytogenetical studies in some genera of Malvaceae, begun 1957, likely to be completed 1962.

Smritimoy Bose :

Cytogenetical Investigations in Cotton, begun 1951, likely to be completed 1963.

Cytogenetical Investigations in Acanthaceae and Papaveraceae, begun 1951, likely to be completed 1963.

Cytogenetical Investigations in Cotton, with special reference to Chromosome Morphology of five types belonging to *Gossypium arboreum* L. pub. in Trans. Bose Res. Institute XIX, 1952-53 : 67-71.

Amal Kumar Basu, Investigations on induced mutations in rice using X-rays and radioactive isotopes, begun 1956.

G. G. Nair, Inducing mutants with desirable economic characters in Til (Sesamum) and Rape and Mustard (Brassica) by ionizing radiations, begun 1957, likely to be completed 1963.

## Chemistry

J. Dutta, P. N. Das and K. Mukherjee :

Effect of Ionising Radiation on Animals, begun 1956, likely to be completed 1965.

Effect of Ionising Radiation on the Nitrogen Excretion in Urine of Albino Rats. Science and Culture. Vol. 22, pp. 691-692 June 1957.

Effects of Gamma Radiation on Nitrogenous end products in Urine of Albino Rats. Proceedings of the National Institute of Sciences of India, Vol. 26, B, No. 1, 1960.

J. Dutta and Mominul Haq, Application of vapour phase chromatography in the analysis of the Tea-essential-oils and petrol, begun 1959, likely to be completed 1963.

## Enzyme Chemistry

Dr. D. P. Burma, Maharani Chakravorty and H. C. Chakravorty, Oxidative and reductive pentose phosphate pathways in plants, begun 1957, completed 1958.

Dr. D. P. Burma and D. K. Basu, Dihydrolipoic dehydrogenase and mechanism of  $\alpha$ -keto acid oxidation, begun 1957, likely to be completed 1964.

## Plant Chemistry

S. Pattabi Raman, Studies on chemical constituents of Indian medicinal plants, begun 1956.

Arun Kumar Barua, Survey of saponin-bearing Plants of India, begun 1955.

Ajit Kumar Banerjee, Studies on the Indian Medicinal Plants, begun 1954, completed 1958.

Debi Prosad Chakravorty, Chemical investigation of Indian Medicinal Plants, begun 1954, completed 1958.

Sachindra Kumar Chakraborti :

Chemistry of Plant Products : Studies on terpenoids and pyrones, begun 1955.

Chemical Investigation of Indian Spices, pub. in Trans. Bose Res. Institute, **21**, 61 (1956-58).

Chemical examination of the seeds of *Luffa acutangula*, pub. in J. Indian Chem. Soc. **35**, 480, 1958.

K. Venkateswara Rao, Isolation of Active Plant constituents and their chemical studies, begun 1954, likely to be completed 1959.

### Physical Chemistry

S. N. De and A. Sen, Activities of Bacteria-free preparations from *Vibrio Cholerae*, begun 1957, completed 1959.

A. Sen and N. K. Shina :

Electrophoretic and sedimentation studies of mustard seed proteins, begun 1956, completed 1959.

Physico chemical studies on crystalline  $\alpha$ -globulin from sesame seeds (*sesamum indicum*), begun 1956, completed 1960.

### Radio Chemical Chemistry

Dr. B. B. Biswas and Dr. S. P. Sen :

Thioctic acid and photosynthesis, begun 1954, completed 1957.

Sulphate reduction in plants, begun 1954, completed 1957.

Role of nucleases in photosynthesis, begun 1957, completed 1958.

The relationship between auxins and nucleic acid synthesis, begun 1957, completed 1958.

D. K. Basu and S. P. Sen, Photosynthesis in *Hydrilla*, begun 1957, completed 1958.

Dr. C. R. Raha and Dr. S. P. Sen, Synthesis of Malic acid-2, 3-C<sup>14</sup>, begun 1956, completed 1958.

Archana Sen Gupta and Dr. S. P. Sen, CO<sub>2</sub> fixation and auxin-induced growth, begun 1957, completed 1960.

Dr. S. P. Sen, The biochemistry of flowering : Tracer Studies, begun 1955.

### Micro-Biology

Dr. Mira Sen (nee Purkayastha), Antibiotics produced by bacteria, begun 1954, completed 1958.

Saroj Bandhu Ghosh, Countercurrent Distribution technique, begun 1953, likely to be completed 1961.

Ajit Kumar Mishra, Ultraviolet induced mutations in Micro-organisms (*Penicillium*, *aspergillus*, *Rhizopus*, *Streptomyces*, *Azotobacter* etc.), begun 1953.

Sankar Lal Chakrabarty :

Studies on the Biochemical mutants of *Streptomyces* spp., begun 1958, likely to be completed 1962.

Study of Induced mutation in *Streptomyces* of a pink coloured strain, pub. in Proceedings Indian Science Congress 47th Session 1960.

Kantilal Chaudhuri :

Genetics of *Neurospora* and other Ascomycetes, begun 1958, likely to be completed 1965.

Apothecia formation of *Ascobolus* sp. in culture media, pub. in Proceedings of the forty-seventh session of the Indian Science Congress Association 1960, Page 335.

Miss Ashalata Pal :

Studies on antifungal antibiotics produced *Streptomyces* spp., begun 1958, likely to be completed 1961.

Effect of media on the production of Antibiotics by *Antinomycetas*, pub. in Proceedings of the 47th Session of the Indian Science Congress 1960.

Rabindra Kumar Sinha, Chemical and Microbiological aspects of Antibiotics, begun 1958, likely to be completed 1962.

Patit Paban Mukherjee :

Studies on the production of antibiotics from a *Pseudomonas* sp., begun 1956, likely to be completed 1961.

An approach to the preparation of cellulose powder for chromatographic separation. Section IV. Chemistry. Proc. 46th Ind. Sci. Congress pp-191. Part III. Delhi-1959.

The role of salting out effect in counter current distribution. Proc. 45th Ind. Sci. Cong. Part III, pp. 80, Madras 1958.

Survey of the actinomycetes occurring in Kashmir soil. Proc. 45th Ind. Sci. Cong. pp. 274, Part III.

### Physics

Dr. M. S. Sinha, N. C. Das and N. N. Biswas :

Identification of Particles from a probable  $\Lambda^0$  decay.

Mean lives of Positive and Negative Mu -mesons.

Production of  $\theta$  from an S event.

Mean life of decay of muons in absence of matter.

The variation of the mean life of muons with the atomic number of absorbers. Begun 1953, completed 1956.

Dr. M. S. Sinha, S. N. Sengupta, C. R. Mallick and N. Chowdhuri :

Cascade decay of a heavy  $K^-$ -meson.

Associated production of a  $\Sigma^0$  and  $K^- \mu^+$

New evidence for a particle of mass  $\sim 525$  me-

Anomalous scattering of low energy muons in copper

Low energy spectrum of sea level electron and muons at  $12^\circ N$ .

Begun 1954, completed 1958.

I. L. Chakraborty, Cosmic ray fragmentation bursts and nuclear interaction of Nucleonic Components, begun 1953, completed 1958.

Bimalendu Mitra, Construction of 14 Mev. Neutron Generator and measurement of fast neutron flux, begun 1958.

A. M. Ghose and N. K. Ganguly :

The absorption coefficients of Gamma Ray, begun 1954, completed in 1958.

Radioactive carbon dating, begun 1954, completed 1958.

Investigations on thermal neutrons, begun 1954, completed 1958.

## T. C. Bhadra :

- Abnormal increase in the Dielectric constant of an electret-forming material, begun 1954, completed 1958.
- On the measurement of the intensity of ultrasonic waves in liquid, begun 1954, completed 1958.
- On the measurement of Ultrasonic power radiated from a quartz crystal Transducer into liquid medium Part I, begun 1954, completed 1958.
- On the measurement of acoustic energy density and streaming velocity to determine the absorption co-efficient by the streaming method. Part II, begun 1954, completed 1958.

## N. N. Biswas :

- Mean life of Mesons in Elements and compounds, begun 1953, completed 1956.
- The dependence of the composite mean life of Mu-Mesons on the atomic number of the Absorber, begun 1953, completed 1956.

**Plant Physiology**

## A. Guhathakurta and B. K. Dutt :

- Reflex arc phenomenon in *Mimosa*, begun 1957, likely to be completed 1962.
- Study of the Electrical correlate of *Desmodium* pulsation, begun 1957, completed 1959.
- Excitatory response of *Mimosa* in a condition of drought, begun 1957, completed 1960.
- Autogenic Responsive Movement of the leaf of *Mimosa pudica*, begun 1955, completed 1957.

## B. K. Dutta and A. Guhathakurta :

- Study on the propagation of action potential with excitatory transmission in *Mimosa*, begun 1957, completed 1958.
- Biphasic electric response during contraction of the pulvinus of *Mimosa*, begun 1957, completed 1958.
- Induced rhythmicity in the leaf of *Mimosa pudica*, begun 1956, completed in 1957.
- Diurnal diametric changes of the pulvinus of *Mimosa pudica* in relation to the spasmodic evening fall of the leaf, begun 1957, completed 1958.
- Spasmodic Evening fall of the leaf of *Mimosa pudica*, begun 1955, completed 1958.
- Study of the diurnal variation of moto-excitability in *Mimosa pudica*, begun 1956, completed 1957.

**Zoology (Physiology)**

- G. C. Bhattacharya, Effect of antibiotics (Penicillin and streptomycin), Vitamin, Hormone, Sulpha drugs etc., on the metamorphosis of tadpoles of *Rana tigrina* and *Bufo melanostictus*, begun 1951 (in progress).

# CENTRAL DRUG RESEARCH INSTITUTE, LUCKNOW

## RESEARCH WORK UNDERTAKEN

### *Indigenous Drugs :*

- (a) Rauvolfia species.
- (b) Melodinus monogynus.
- (c) Euphorbia acaulis.
- (d) Cissampelos pareira.
- (e) Millettia pachycarpa.
- (f) Picrorhiza kurrooa.
- (g) Psoralea corylifolia.
- (h) Ailanthus malabarica.
- (i) Caesalpinia digyna.
- (j) Coccinia indica.
- (k) Kurchi alkaloids.
- (l) Vegetable insecticides and anthelmintics.

### *Synthetic Drugs :*

- (i) Potential antimycobacterial agents.
- (ii) Neuromuscular blocking agents.
- (iii) Potential amoebicidal agents.
- (iv) Filaricides.
- (v) Fungicides.

### *Enzyme Inhibition Studies :*

#### *Hormones :*

- (a) Melanophore hormone.
- (b) Hyperglycaemic factors.
- (c) Sex hormones.
- (d) ACTH.
- (e) 19-Nor testosterone for oral contraceptive effect.

### *Antibiotics :*

- × 29C.
- × 340.

### *Pharmaceutical Preparations :*

- (a) Protein hydrolysates from oil seed cakes.
- (b) Vitamin B<sub>2</sub> & B<sub>12</sub>.
- (c) Animal feed pellets.
- (d) Cardiotonics.

These studies have been taken up with a view to find out new drugs for diseases like, Cholera, Typhoid, Plague, Amoebiasis, Diabetes, Leucoderma, Atherosclerosis, Tuberculosis, Leprosy, Virus diseases, etc.

## LIST OF PUBLICATIONS

1954

- S. N. Iyer, A. T. Dudani and D. L. Shrivastava, Aureomycin inactivation by pathogenic bacteria, pub. in *Experientia* X/6, 249.
- V. N. Sharma, J. D. Kohli and B. Mukerji, Chemistry and pharmacology of Rauwolfia, pub. in *J. Sci. Indus. Res.*, 13A, 6, 261-272.
- R. N. Iyer, Nitya Anand and M. L. Dhar, Synthesis of potential amoebicidal, pub. in *J. Sci. Indus. Res.* 13B, 6, 451-452.
- I. M. Chak and Amiya B. Kar, The Effect of Estradiol Dipropionate on the development of *Trypanosoma equiperdum* in rats and mice, pub. in *J. Sci. Indus. Res.*, 13B, 7, 480-482.
- K. L. Arora and C. R. Krishna Murti, Enzyme inhibition studies in relation to Drug action: Part VI—Action of certain antibacterial agents on the succinic oxidase system, pub. in *J. Sci. Indus. Res.*, 13B, 7, 482-487.
- S. K. Chatterji, V. N. Sharma and M. L. Dhar, Chemical examination of the root bark of *Melodius monogynus* Roxb: Part I, pub. in *J. Sci. Indus. Res.*, 13B, 8, 546-549.
- S. Ghatak, D. C. Dhar, S. C. Agarwala and D. L. Shrivastava, Changes in ascorbic acid metabolism in Guinea-pigs during fracture, pub. in *J. Sci. Indus. Res.*, 13B, 8, 549-553.
- S. L. Nayar,  
Poisonous seeds of India: Part I, pub. in *Bom. Nat. Hist. Soc.*, 52, 1, April, 88-105.  
Poisonous Seeds of India: Part II, pub. in *Bom. Nat. Hist. Soc.*, 52, 2 and 3, Aug.-Dec., 505-532.
- J. N. Karkun and Amiya B. Kar, Studies on Cytochemistry of Hormone action Part XV, pub. in *Proc. Nat. Inst. Sci. India*. XX, 4, 427-430.
- N. M. Khanna, Chemical examination of *Euphorbia acaulis* Roxb, pub. in *Indian J. Pharm.* XVI, 110-111, 5.
- J. N. Karkun, Amiya B. Kar and S. N. Datta, The Effect of Melenophore Hormone on the Adrenals of Hypophysectomized Rats, pub. in *Acta Endo.*, 16, 187-192.
- S. N. Iyer, A. Dudani, C. R. Krishna Murti and D. L. Shrivastava, Effect of NaCl in the aspartic acid deaminase of *Vibrio Cholerae*, pub. in *Enzymologia*, 16, 285-288.
- S. C. Agarwala, C. R. Krishna Murti and D. L. Shrivastava, Metabolism of purine and pyrimidine compounds by *Vibrios*, pub. in *Enzymologia*, 16, 322-328.
- V. C. Vora, Mrs. K. Shete and A. T. Dudani, A new antibiotic from a non-pigmented strain of *penicillium notatum* Westling, pub. in *J.S.I.R.*, 13B, 10, 707-709.
- Mrs. K. Shete, V. C. Vora and A. Dudani, Screening of Actinomycetes for Vitamin B<sub>12</sub> production, pub. in *J.S.I.R.*, 13B, 10, 743-744.
- A. T. Dudani, A simple method for invitro testing of the antibacterial action of insoluble compounds, pub. in *J.S.I.R.*, 13B, 11, 817-818.
- A. B. Kar, J. N. Karkun, A. C. Roy and N. N. De, The influence of thyroxine on the response of the ovary of immature rats to gonadotrophic hormone, pub. in *Arch. Int. Pharmacodyn.*, XCIX, 1 97-103.

- S. N. Iyer, A. Dudani and C. R. Krishna Murti, Studies on the enzyme make-up of *V. Cholerae* IV—Screening of Vibrios for penicillinase, pub. in J.S.I.R., 13, 844-846, 12.
- K. C. Saxena, S. N. Ghatak and S. C. Agarwala, Inhibition of Thiamine synthesis by Vitamin B<sub>12</sub> in wild strains of *E. coli*, pub. in *Experientia* X/12, 1954, 488-491.
- G. C. Shrivastava, K. L. Arora and S. S. Bhatnagar, Aryl sulphatase activity in *S. typhosa*, pub. in *Experientia* X/12, 1954, 493-96.
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- G. C. Shrivastava, S. C. Agarwala and S. S. Bhatnagar, Studies on the oxidative metabolism of *Salmonella Typhosa* in relation to Antigenicity and Virulence, pub. in *Enzymologia*, XVII, 15, VII, 41-46.
- A. Mukherji, Testing of Insoluble Drugs and Oils for their Bactericidal properties, pub. in *Indian Medical Gazette*, Vol. LXXXIX, No. 7, 1954, 415-418.

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- Miss S. Mehboob and M. L. Dhar, Studies in potential Amoebicides : Part II synthesis of some polymethylene diamines, pub. in J.S.I.R., 14B, 1955, 1, 1-6.
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Studies on Enzyme inhibition in relation to drug action : Part VII—Action of certain antibacterial agents on tryptophanase, pub. in J.S.I.R., 14C, 1955, 1, 6-11.  
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- S. Ghatak, C. R. Krishnamurti, Preparation of phosphatides from Indian Pulses, pub. in J.S.I.R., 14C, 1955, 2, 58-59.
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- R. P. Rastogi, A. B. Sen and M. L. Dhar, Chemical examination of *Picrorhiza Kurrooa Benth*, pub. in *Bull. Nat. Inst. Sci. Ind.*, 4, 1955, 47-57.
- S. L. Nayar,  
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- P. K. Roy, G. K. Roy and B. Mukerji, Biological assay of preparations of *Rauwolfia serpentina Benth* for their Hypopietic potency, pub. in *Bull. Nat. Inst. Sci. Ind.*, 4, 1955, 67-70.
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- S. C. Agarwala and K. C. Saxena, Possibility of preparation of peptones, from oil seed cakes, pub. in Bull. Nat. Inst. Sci. Ind., 4, 1955, 79-80.
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- S. K. Mukherji, U. N. De and B. Mukerji, Studies in Experimental Diabetes—Part I:—Effect of Administration of different sugars in blood glutathione and its relation to the incidence of experimental (alloxan) diabetes, pub. in Ind. J. Med. Res., 43, 1, 1955, 149-156.
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The influence of HGF on Glycogenolysis in skin, pub. in Acta, Endo, 18, 1955, 299-304.
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- Miss S. Mathew and A. T. Dudani, Lysis of human pathogenic bacteria by Myxo-bacteria, pub. in Nature, 175, 1, 1955, 125-126.
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- M. M. Dhar and S. Bhattacharji, A method for the estimation of reserpine in samples of Rauwolfia alkaloids, pub. in J. Sci. Ind. Res., 14B, 6, 1955, 276-278.
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## **CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE, MYSORE**

Cream of Tartar and Pectin from Tamarind Pulp.

Pan Supari Nectar.

Cashew Apple Products.

### *New Fruit Products :*

Ripe Jack fruit bulbs have been successfully canned and methods standardized for preparing jack fruit nectar and jack fruit slabs. A thick aromatic syrup has also been prepared from the jack fruit rind.

Several attractive products like chips, toffee and glace figs have been prepared from bananas.

After removing the harmful ingredients present in them, tender bamboo shoots have been utilized in the preparation of products like pickle, chutney, curried vegetable, candy and canned shoots in syrup or brine.

Passion fruit squash, an excellent beverage with a pleasing and delicate aroma has been prepared from passion fruit which grows wild in Nilgris and Coorg.

### *Food Adjuncts :*

Chemistry, composition and standards for asafoetida have been studied.

Existing literature on saffron has been reviewed with a view to finding out methods of detecting 'sophistication'. Samples of saffron have been analysed and further studies to establish its nutritional value are planned.

### *Adhesives :*

Four different compositions have been developed for a suitable adhesive for labels on aluminium foil-wrapped tea packets.

### *Canning of Drinking Water :*

A systematic investigation on the subject was undertaken and a method has been standardized for canning of drinking water.

### *Detection of adulteration in Ghee :*

Simplification of the Baudouin test.

Role of Protein rich foods.

Bacterial Control of insects.

### *Packaging Research :*

Investigations on the developing of cushioning boards and insulation material from agricultural wastes such as pith,

*Research on Fish Technology :*

The work in progress covers freezing, canning and drying of fish as well as methods of storage using antibiotic ice. It includes methods for retaining the freshness of fish for commercial processing. Objective methods for the evaluation of the quality of fish are also being worked out to deal with problems relating to the transport and marketing of fresh fish.

**AD HOC SCHEMES***Coffee Research Unit :*

Tentative standards have been worked out for being adopted as standards in the Food Adulteration Act of the Government of India. A simple test for the detection of adulteration in coffee has been developed. A wetting technique has been developed whereby it is possible to get from a given amount of coffee powder more extractives and larger number of cups of coffee than by the conventional methods. Coffee filters of varying capacities for household use have been designed to give better extraction and percolation. Coffee husk has been found to be a good substitute for chicory. Some studies on the nutritive value of coffee and the method of preparing soluble coffee have been undertaken. Investigations on the chemical composition of coffee and the aromatic constituents are in progress.

*Tea Research Unit :*

Collects data on the chemical composition of Indian Teas and ascertains seasonal, regional and grade variations in their composition. The data thus collected will form the basis for fixing standards of tea. Problems related to the detection of adulteration in tea and the manufacturing techniques for liquid concentrates of tea and soluble tea are also being studied.

*Fruit Products Order Unit :*

Under the provisions of the Fruit Products order of the Government of India, analyses of both Indian and foreign fruit and vegetable products are being undertaken to ascertain the extent of genuine products available in the market.

*Indian Council of Medical Research Schemes :*

In collaboration with the I.C.M.R., investigations are in progress on :

1. Parboiling of Rice.
2. Nutritive value of foodstuffs.
3. Studies on Calcium, Phosphorus and Protein metabolism including utilization of Dietary Vegetable Proteins.
4. Effect of Insect Infestation on the Nutritive Value of Foods.
5. Studies on Lytherism.

*Indian Central Oilseeds Committee Schemes :*

1. Utilization of oilseed Meals for the Preparation of Protein Rich Foods.
2. Preparation of Edible Quality Protein from oilseed cakes.

*Monographs and Bulletins :*

1. Literature Survey on Oils and Fats. (Annual since 1951)
2. Indian Food Laws.
3. Indian Sago Industry.
4. Chemical Investigations on Indian Tea.
5. Coffee — what the consumers should know.
6. Ahara Vignana in Kannada.
7. Khadya Vigyan in Hindi.

*Symposia Organised :*

1. Food and Population.
2. Development of Food Industries in India.
3. Technical aid to Food Industries.
4. Fruit and Vegetable Preservation Industry in India.

(Proceedings of the above are published in bookform which are available from the Institute.)



## **CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE, CALCUTTA-32**

*Research work was carried out on the following subjects :*

- (1) Survey and evaluation of clay deposits.
- (2) Dental Porcelain.
- (3) Spark plugs.
- (4) Shattering of sanitarywares.
- (5) Peeling of glazes.
- (6) Low temperature Vitrifying Ceramic bodies.
- (7) Boron-free lead-free glazes.
- (8) Super silica refractories.
- (9) Improved fireclay refractories.
- (10) Chrome-alumina refractories.
- (11) Refractories from sillimanite waste.
- (12) Single coat boron-free vitreous enamels.
- (13) Cobalt free ground coat enamel.
- (14) Jewellery enamels.
- (15) Wet ground mica.
- (16) Mica paints.
- (17) Shortened method of analysis of silicates.
- (18) Plaster of Paris.
- (19) Titania glasses.
- (20) Copper colours in glasses.
- (21) Economising the use of selenium for decolourisations of glass.
- (22) Production of optical glass.
- (23) Magneto-spectrophotometric studies on glasses.
- (24) Glasses for industrial goggles.
- (25) Fundamental studies of Indian Clays.

## CENTRAL INLAND FISHERIES RESEARCH STATION, CALCUTTA-9

- Dr. V. G. Jhingran, Age, growth, migration of other aspects of fish biology and Fishery Science, begun 1954.
- S. Patnaik, Lacustrine Fishery biology, begun 1957, likely to be completed 1961.
- S. N. Das Mohapatra, Lacustrine Fishery Survey, begun 1957, likely to be completed 1961.
- K. N. Mishra, Lacustrine Fishery Survey, begun 1957, likely to be completed 1961.
- S. Jena, Lacustrine Fishery Survey, begun 1957, likely to be completed 1961.
- D. K. Bhowmick, Lacustrine Fishery Survey, begun 1957, likely to be completed 1961.
- K. L. Shah, Observations on the Plankton of the Chilka Lake, begun 1958, likely to be completed 1960.
- Dr. M. P. Motwani and S. J. Karamchandani, Biology of true *Butchwa*, *Eutropiichthys Vacha* (Ham.), begun 1954, likely to be completed 1956.
- Dr. M. P. Motwani,  
Stream pollution studies. Effects of sugar mill wastes on the fisheries of Suvaon River at Balrampur (U.P.), begun 1955.  
Fish and Fisheries of the river Ganga system at Allahabad with catch statistics for the year 1954-57.  
Fish and Fisheries of the Ganga at Buxar with catch statistics for the years 1956-58.
- Dr. M. P. Motwani and S. N. Saigal, Biology of *Mystus aor* (Ham.) and *Mystus seenghala* (sykes), begun 1956, likely to be completed 1960.
- A. David.  
Biology of the cat-fish, *Pangasius pangasius* (Ham.) and possibilities of its culture in carp ponds, begun 1954, likely to be completed 1956.  
Some aspects of the fishery biology of *Mystus gulio* (Ham.), begun 1954, likely to be completed 1956.  
River pollution studies: Effects of Calcutta sewage on the fisheries of Kulti estuary and connected waters, begun 1954, likely to be completed 1956.  
Observations on the spawning movements of the Gangetic carps and on carp seed resources in India, begun 1954, likely to be completed 1956.  
Embryonic and larval development of the gooch, *Bagarius bagarius* (Ham.) and the cobitid, *Botia geto* (Ham.), begun 1956, likely to be completed 1957.  
River pollution studies. Effects of industrial wastes on the fisheries of the Ganga River at Kanpur (U.P.), begun 1958, likely to be completed 1959.
- S. J. Karamchandani, Embryonic and larval development of some species of fish from Chilka Lake, begun 1956, likely to be completed 1958.

- S. J. Karamchandani and M. P. Motwani, Biology of the *Butchwa*, *Clupisoma garua* (Ham.), begun 1954, likely to be completed 1956.
- A. V. Natarajan, Biology of *Catla catla* (Ham.) and *Silondia silondia* (Ham.) from river Ganga, begun 1958, likely to be completed 1962.
- P. Roy, R. D. Chakraborty and S. B. Singh, Quantitative studies of the plankton and the physico-chemical conditions of the river Jamuna at Allahabad, begun 1954, likely to be completed 1955.
- P. Roy, S. J. Karamchandani and R. D. Chakraborty, Studies on the physico-chemical conditions of the carp breeding ground at Jhansi, begun 1954.
- P. Roy, S. B. Singh and K. L. Sehgal, Studies on the hydrology of the rivers Ganga and Jamuna at Allahabad and its bearing on their biological productivity, begun 1958, likely to be completed 1960.
- S. B. Singh and R. D. Chakraborty, Quantitative studies of the plankton and the physico-chemical conditions of the river Jamuna at Allahabad, begun 1954, likely to be completed 1955.
- S. B. Singh and K. L. Sehgal,  
 Studies on the hydrology of the rivers Ganga and Jamuna at Allahabad and its bearing on their biological productivity, begun 1958, likely to be completed 1960.  
 Bottom biota, littoral fauna and zooplankton of the Ganga river system at Allahabad. Studies on the hydrology of the river Ganga and Jamuna at Allahabad and its bearing on their biological productivity, begun 1958, likely to be completed 1960.
- S. B. Singh,  
 Some aspects of fishery biology of *C. mrigala* (Ham.), begun 1954, likely to be completed 1957.  
 Food and feeding habits of clupieds and forage fishes of the Ganga river system at Allahabad, begun 1956, likely to be completed 1957.
- S. B. Singh and P. Roy, Some observations on the juvenile mortality of major carps in certain sections of the river Ganga in Bihar and Uttar Pradesh, begun 1955, likely to be completed 1956.
- K. L. Sehgal,  
 Some aspects of fishery biology of *Chela gora* (Ham.), *Chela bacaila* (Ham.) and *Aspidoparia morar* (Ham.), begun 1957, likely to be completed 1959.  
 Key to the identification of the common species of the genus *Diaptomus* westwood, from fish ponds in N.E. India, begun 1956, likely to be completed 1957.  
 Entomostraca of Uttar Pradesh, begun 1958, likely to be completed 1960.  
 Larval development of *Barillus vagra*, *Chela gora* and *Mugil cascasia*, begun 1957, likely to be completed 1958.
- K. L. Sehgal and M. P. Motwani, Systematic position of *Ailia coila* and *Ailichthys punctata*, begun 1957, likely to be completed 1959.
- B. N. Saigal,  
 Fishery Biology of *Mystus aor* (Ham.) *Mystus seenghala* (sykes). Stream pollution studies. Effects of sugar mill wastes on the fisheries of Suvaon River at Balrampur (U.P.), begun 1956, likely to be completed 1960.  
 Some aspects of fishery biology of *Pseudotropius murius* (Ham.), begun 1958, likely to be completed 1959.

- A. G. Jhingran, Some aspects of the fishery biology of clupeids from Ganga River system at Allahabad, begun 1958, likely to be completed 1959.

#### D. Sc.

- Sm. K. Rajyalakshmi, Studies on the maturation, breeding and life history of palaemonid prawns, begun 1957 and likely to be completed 1960.

### ESTUARINE FISHERIES

- Dr. T. V. R. Pillay, The structure of Hilsa fish populations of India ; the effect of commercial fishing on the fish populations of the estuaries of Hooghly, Matlah and Mahanadi ; Ecology of brackish-water fisheries.
- Dr. K. K. Sarojini, The dynamics of Hilsa fish populations of Indian waters.
- V. R. Pantulu, Catfish fisheries of Hooghly and Matlah estuaries ; surveys of eggs, larvae and young fish of estuarine waters.
- H. P. C. Shetty, Survey of estuarine fisheries of Mahanadi ; Zooplankton of estuarine waters, fisheries of Threadfins and Setipinna.
- B. Pakrasi, Culture of brackishwater fishes in ponds.
- M. M. Kunju, Prawn fisheries of estuarine areas of Hooghly, Matlah and Mahanadi estuaries.
- A. N. Ghosh, Hilsa fisheries of West Bengal ; spawning Surveys of Hilsa in the Hooghly Estuary.
- R. M. Bhowmick, Mulletts and Miscellaneous fisheries of estuaries.
- A. K. Gorai, Sciaenids and Bombay duck fisheries of estuaries.
- M. K. Kutty, Studies on Hilsa fisheries of Orissa, Bihar and U.P.
- K. K. Ghosh, Study of Catch Statistics of Hilsa ; biometrical studies of Hilsa populations.
- M. R. Vijayaraghavan, Qualitative and quantitative studies of benthic flora of brackishwater ponds ; experiments in algae culture.
- S. C. Thakurta, Studies on the soil of brackishwater ponds and its role in the productivity of such ponds.
- S. B. Saha, Phytoplankton of estuaries.
- T. J. Varghese, Miscellaneous Clupeoid fisheries of estuaries.
- K. Venkateswara Rao, Hilsa fisheries of Andhra and Madras.
- N. G. S. Rao, Studies on the estuaries fishes of Mahanadi estuary.
- B. B. Ghosh, Hydrology of estuarine areas of West Bengal.
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NEW FOREST P.O., DEHRA DUN**

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K. N. Katiyar, Morphology and Bionomics of the Family Acridiidae, (Orthoptera : Insecta) with special reference to oviposition and the comparative structure of eggpods and eggs, and other papers connected with the research subject in the following journals :—

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2. Jr. Bombay Nat. Hist. Soc. Bombay, 1956.
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# INDIAN INSTITUTE OF SCIENCE, BANGALORE-3

## Aeronautical Engineering

### *Aerodynamics :*

- Construction of 5'  $\times$  7' wind tunnel.
- Construction of 14'  $\times$  9' open circuit wind tunnel.
- Construction of spinning wind tunnel.
- Construction of 7"  $\times$  5" supersonic wind tunnel.
- Construction of 1"  $\times$  2" Induction tunnel.
- Construction of 1"  $\times$  3" supersonic wind tunnel.
- Construction of 4"  $\times$  1" induction transonic tunnel.

### *Boundary Layer Research :*

- Theoretical studies on wing theory and compressible flow problems :
  - (a) Unsteady lifting surface theory for flutter and stability calculations.
  - (b) Lifting surface theory applied to control surface deflection.
  - (c) Solution of Prandtl-Mayer's expansion in viscous flow.

### *Structures :*

#### (1) Material Testing :

- (i) Construction of a fatigue testing machine.
- (ii) Investigations to find out Notch brittle (failure) in specimens having collars.

#### (2) Landing gear tests :

Design and fabrication of a release mechanism to release the landing gear in order to design the mechanism for recording the V-g diagram.

#### (3) Experimental stress analysis :

- (i) Stress coat experiment : Studies on determining the inter-relationship between strain, strain sensitivity, thickness and crack density of the stress coat is being investigated under biaxial stress conditions.

Tests to obtain stress patterns using stress coats on models of swept wings.

Work on the location of the elastic axis for various shapes of idealised swept wings.

- (ii) Photoelasticity : Fabrication of a furnace for freezing stresses in three-dimensional problems and a universal loading frame.

Work on the design of temperature controls.

Design and construction of an optical lateral extensometer to measure the variation in thickness of photoelastic models and an oblique incidence jig to stress analyse slices in frozen photo-elastic models.

Work on stress analysis of built-up box beams and rotating discs of non-uniform thickness by the freezing technique.

- (iii) Strain gauges : Study of the gauge factors of various types of wires used in wire resistance gauges.

**(4) Relaxation methods :**

As applied to torsion problems of multiply connected sections :  
 Investigations of the torsion problem of a regular hexagonal shaft pierced with a central circular hole.  
 Solution of the problem of a solitary wave.

**(5) Problems in Applied Elasticity :**

Development of more refined methods for analysis and design of partially fixed beams, beam columns, rectangular plates and circular plates.

Long rectangular plates subjected to uniformly varying loads.

Long rectangular plates under line loads with elastically restrained edges.

Investigation of temperature stresses in elastically restrained rectangular and square plates.

Design and construction of an experimental equipment to verify the results derived theoretically on elastically restrained beams.

A derivation for the classical biharmonic equation for small deflections of a finite plate has been made taking the transverse shear effect into consideration.

Grouts' method of solution is being applied in the solution of problems of plates with large deflections.

The effect of small central circular holes on vibration characteristic of plates.

Vibration characteristics of elastically restrained square plates.

Thermal stresses in thin plates with large deformations.

**Instruments :**

(1) Mesh shadows : Attempts are being made to prepare an accurate mesh work having a large number of rulings per centimetre.

(2) Construction of a series interferometer.

(3) Construction of models to illustrate the principles of the gyroscope.

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- C. L. Amba Rao and S. R. Telang, Evaluation of Stresses in a U-shaped Member by the Shear Difference Method, pub. in *Ibid.*, July 1954, Sec. B, 95-101.
- P. Narasimhamurthy, Torsion of Multiply Connected Sections, pub. in *Ibid.*, October 1954, Sec. B, 150-58.

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- A. Das, A  $1'' \times 2''$  Induction Transonic Wind Tunnel Report prepared for restricted circulation.
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- C. V. Joga Rao, Long rectangular plates subjected to line loads, Paper presented at the First National Congress of Theoretical and Applied Mechanics, held in Nov. 1955.
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- S. Kumar and O. G. Tietjens, A note on the circulation function and the induced efficiency of an 8-bladed propeller, pub. in Jour. Ind. Inst. Sci., 1955, **37 (1)**.
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### REPORTS FOR RESTRICTED CIRCULATION

- T. N. Krishnaswamy and A. Das, Tests on H. T. 10 Dive Breaks A. E. Department Report submitted to H. A. L.
- A. Das, A  $1'' \times 2''$  Induction Transonic Wind Tunnel, A. E. Department Report.

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- C. L. Amba Rao,  
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- A. K. Roy, Study of the curving of the free jet, pub. in Proc. of 44th Session of Ind. Sci. Congress, 1957.



## Applied Mathematics

- S. K. Lakshmana Rao and P. L. Bhatnagar, A Note on the Gegenbauer Transform.
- P. L. Bhatnagar and Pyare Lal, Non-Adiabatic Pulsations of a Stellar Model.
- P. L. Bhatnagar and P. D. Verma, On Superposable Flows.
- S. K. Lakshmana Rao, Theorems on the Vorticity Measure.
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- S. K. Lakshmana Rao, Characteristic Relations for the Ultraspherical Polynomials.
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## General Chemistry

### HIGH PRESSURE REACTIONS

- V. A. Krishna Murthy and M. R. A. Rao,
- (1) Investigations on the reaction of alicyclic compounds such as cyclohexene dipentene, and  $\alpha$ -pinene, etc., with synthesis gas ( $\text{CO} + \text{H}_2$ ) at high pressure in the vapour phase over Fischer-Tropsch catalysts.
  - (2) High pressure reaction between ammonia and higher aliphatic and alicyclic alcohols.
  - (3) The optimum operating conditions have been determined for the reaction of ethylene dichloride with liquor ammonia employing a pressure reactor.
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  - (5) Ammonolysis studies on glycol and aliphatic halides like ethylene-dichloride.
- K. Z. Patil and M. R. A. Rao, Reaction of carbon dioxide and aliphatic amines.
- G. K. Narayana Reddi and M. R. A. Rao, Studies on the reaction of carbon monoxide with polyhydric alcohols.
- T. Venugopalacharlu and M. R. A. Rao, Investigations on the reaction of carbon dioxide with aliphatic amines.
- S. Sathyanarayana and M. R. A. Rao, Preparation of pyridine carboxylic acids by oxidation of methyl pyridines.
- A. Aga and M. R. A. Rao, Further adsorption work on iron oxide, nickel oxide and cobalt oxide catalysts.

- V. Srinivasan and K. R. Krishnaswami, Investigations on the adsorption of  $N_2$ , CO and  $H_2$  on Cobalt-Kieselguhr and nickel-Kieselguhr.
- M. A. Cohly and M. R. A. Rao, Study of the egg white proteins and their interaction with anionic detergents as specific precipitants of different fractions.
- N. H. Sivaramakrishnan, Studies on the hysteresis effect in sorption of organic liquids on charcoal surfaces.
- N. H. Sivaramakrishnan and R. D. Vold,  
Studies of the adsorption of ionic and non-ionic detergents on non-porous colloidal carbons.  
Effect of surface heterogeneity on the adsorption of surfactants by carbon.
- R. D. Vold,
  1. Stability of Non-Aqueous Suspensions.
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- S. R. Sivaraja Iyer and R. D. Vold,  
Colloidal properties of Humic acids and their precursors.  
Micellar size and shape in Non-aqueous solutions of heavy metal soaps.
- S. Soundararajan and M. J. Vold, Kinetics of the Hydrolysis of substituted amides.
- D. V. Rathnamma and M. J. Vold, Studies of the sedimentation volume, rates of coagulation and collective sedimentation and rheological properties of suspension of lithium stearate in hydro-carbon solvents with and without small admixtures of polar additives.
- M. J. Vold,
  1. Vander Waal's interaction of colloidal particles.
  2. Dielectric constant and dielectric loss factor in non-aqueous dispersions.
- G. Aravamudan and K. R. Krishnaswami, The Quaternary system ammonium nitrate-ammonium sulphate-water-methanol at 30°C.
- S. Soundararajan and K. R. Krishnaswami, Investigation of the dipole moment and molecular structure of complex salts of 8-hydroxy quinoline with metals.

### ELECTRO-DEPOSITION

- S. Satyanarayana and T. L. Rama Char, Nickel-zinc alloys of different composition have been electro-deposited using the sulphamate solution.
- S. K. Panikkar and T. L. Rama Char, Co-deposition of the alloy of nickel and copper from the pyro-phosphate bath.

### ELECTRO-CHEMISTRY AND CORROSION

- J. L. Vaid and T. L. Rama Char, X-ray studies on tin alloys, electro-deposited from the pyro-phosphate bath.
- S. K. Panikkar and T. L. Rama Char, Nickel-tungsten alloys from the pyrophosphate bath.
- Miss Vasantha Sree and T. L. Rama Char, Detailed investigations on the effect of the variables on efficiencies, alloy plate composition and potentials during the electro-deposition of brass from the pyrophosphate bath.

T. L. Rama Char and Co-workers,

1. Studies on the structure and properties of brass deposits from the pyrophosphate bath and the anode behaviour during alloy deposition.

2. Studies on the composition of the pyrophosphate bath for the direct plating of copper on steel.

J. Sundararajan and T. L. Rama Char, Electro-Chemistry of the inhibition of the corrosion of aluminium.

C. S. Ramanathan and R. S. Subrahmanya, Study of the polarographic behaviour of uranyl ion in complexing agents.

R. S. Subrahmanya,

1. An apparatus has been built for super-imposing a constant small A.C. Voltage over the varying conventional D.C. Voltage. Attempts are being made to study the reduction processes employing this set-up.

2. Polarographic behaviour of chromium with Disodium salt of Ethylenediamine Tetra Acetic Acid (E.D.T.A.) as the complexing agent.

## INORGANIC AND MINERAL CHEMISTRY

R. M. Mallya, D. S. Bharadwaj, A. R. Vasudeva Murthy and K. R. Krishnaswami, Investigations on the preparation and properties of carbonates and bicarbonates of nickel and cobalt.

P. V. Padmavathi and K. R. Krishnaswami, Investigations on thorium compounds.

C. C. Patel, Complexes of thorium and of uranium with morellin.

K. N. Venkataraman and M. R. A. Rao, Metal chloride complexes of phosphorus oxychloride.

K. N. Vishweshwaraiah and C. C. Patel,

Solubility of Lithium Phosphate in alcohols of different concentrations.

Solubility of Trilithium phosphate.

C. N. Govinda Rao and C. C. Patel, Petrochemistry of the Schistore formation in Bangalore and Mysore districts.

G. Aravamudan and K. R. Krishnaswami, Studies in phase rule.

K. N. Vishweshwaraiah, C. C. Patel and K. R. Krishnaswami, Studies on a gravimetric method for the estimation of lithium.

A. R. Vasudeva Murthy and V. A. Narayan, Studies on the isolation of inorganic compounds on filter paper by the method of partition chromatography using circular paper chromatographic technique.

C. N. Govinda Rao, M. S. Mohan and C. C. Patel, Investigations on the conditions for the separation of iron pyrites and chalcophyrite from the Ingaldhal (Mysore State) copper-bearing sulphide ore and pyralusite and haematite from the ferruginous manganese ore of Goa.

K. N. Venkataraman and K. R. Krishnaswami, Investigations on the reaction between anhydrous aluminium chloride and phosphorus oxychloride.

B. K. Balasubramanyam and C. C. Patel, Estimation of microquantities of impurities in lead.

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- Isolation and characterisation of anaerobic bacteria associated with the retting of *Malachra capitata* and *Hibiscus cannabinus*.
- Nutritional studies on the bacterial isolates obtained from the alimentary canal of the silkworm.
- Nutritional status of the fermented groundnut as compared with the raw and the roasted nut.

Standardisation of suitable methods for application in the study hippuric acid decomposition by bacteria.  
 Animal experiments designed to study if the "riboflavin" contents of saffron are available to the animal system.  
 Determination of the Alcohol tolerance of some yeast strains.  
 Establishing the lipid constituents disappearing as a result of fermentation of the groundnuts.

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(a) The separation of hafnium from zirconium.  
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E. G. Ramachandran and B. S. Subramanya, C.S.I.R. Scheme on "Electrical Resistance Strain Gauges."

Brahm Prakash, E. G. Ramachandran and A. Subramanya Iyer, C.S.I.R. Scheme on "Electrical and Mechanical Properties of Aluminium-Rich Alloys."

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- During the year under review, the following technical reports were submitted in reference to sponsored research projects :*
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- E. G. Ramachandran and B. S. Subrahmanya, C.S.I.R. Scheme on "Electrical Resistance Strain Gauges".
- Brahm Prakash, E. G. Ramachandran, R. Narayanan and S. D. Baijal, C.S.I.R. Scheme on "Electrical and Mechanical Properties of Aluminium-rich Alloys".
- D. L. Bhattacharya and K. S. Grewal, C.S.I.R. Scheme on "Study of the Growth of Precipitate Particles in the Ageing of 24 S. Aluminium Alloy by Electron Microscope".
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- E. G. Ramachandran and N. S. Ramamurthi, C.S.I.R. Scheme on 'Electrical Resistance Strain Gauges'.
- Brahm Prakash, E. G. Ramachandran, T. R. Anantharaman and G. Rangarajan, C.S.I.R. Scheme on 'Electrical and Mechanical Properties of Aluminium-rich Alloys'.
- D. L. Bhattacharya and K. S. Grewal, C.S.I.R. Scheme on 'Study of the Growth of Precipitate Particles in the Ageing of 24-S Aluminium Alloy by Electron Microscope'.
- Brahm Prakash, C. V. Sundaram and A. V. Ramana Rao, A project on the 'Metallurgy of Zirconium' sponsored by the Department of Atomic Energy.

## Physics

### RAMAN EFFECT STUDIES

Spectroscopic studies of the light scattered by few alkali halides and other crystals using the three metre quartz spectrograph and the ultra violet techniques with a view to verifying the additional

theoretical prediction of the most general theory of light scattering by birefringent crystals. Application of this method for a determination of the elastic constant of crystals have been critically examined.

Investigation in the Raman Spectra of methyl and ethyl esters of Benzoic acid, of ethylene glycole and ethylene chlorohydrin.

The Raman Spectrum of Strontianite was investigated.

A Study of the influence of temperature on the Raman Spectrum of Alumina and anhydrite.

Study of Molecular vibration by Raman effect and infra-red absorption of Phosphorous Oxychloride by evaluation of force constants using the group theoretical Method of Bright Wilsom and his associates.

Study of the Raman Spectra of the hydrocarbon cyperene II and its partially and completely hydrogenated products with Hg  $\lambda$  4358 as exciting radiation and determination of possible position of the double bonds in these compounds.

Measurements on the intensity of the vibrational bands of  $\text{SO}_2$  and  $\text{H}_2\text{S}$  using the Perkin Elmer Model 112 Infra-red Spectrometer and utilisation of  $(d\mu/dr)$  calculated therefrom for a study of the changes in bond moments.

An investigation of the infra-red and Raman Spectrum of witherite.

Qualitative Analysis of Organic compounds — Potassium Oxalate, copper sodium oxalate, copper ammonium oxalate, sodium citrate, copper acetate, copper propionate and copper butyrate by using infra-red techniques.

## OPTICAL STUDIES

Analysis of scattered radiations in some emulsions and monodisperse sulphur sols. containing spherically symmetric and uniform size particles to establish the constancy the phase difference.

Accurate measurement of the intensity of the transversely scattered light at different wave length for six typical silver sols. using a photomultiplier.

Utilisation of the light scattering measurements for an investigation of the variation of micellar size in aqueous solutions of benzopurine 4B for different salt of concentrations and at 26° and 75°C during the dyeing of cotton.

Design of an accurate Analyser using the concept of Poincare sphere and incorporating the half shade principle for the determination of both the azimuth and the ratio of the axes of the ellipse.

Investigations on the size, shape and structure of the micelles in solution of chlorinated rubber.

Obtaining of precise magneto-optic data over a considerable range of wave length ( $\lambda$  5790— $\lambda$  2848) for crystals KCl, KBr, KI, LiF, MgO,  $\text{Pb}(\text{NO}_3)_2$ ,  $\text{Sr}(\text{NO}_3)_2$ ,  $\text{Ba}(\text{NO}_3)_2$ ,  $\text{NaClO}_3$ ,  $\text{CaCO}_3$ , fused silica and optical glasses.

Magneto-optic method for determining the stress optic co-efficient and developed it for the study of the dispersion of piezo-optic co-efficient in glasses.

Accurate measurement of the temperature of both the refractive index and optical activity over a wide range of wavelength for sodium chlorate.

Elliptic polarisation of the transversely scattered light in some typical sols, containing large anisotropic particles.

### X-RAY AND CRYSTAL STRUCTURE

Crystal structure by X-rays ammonium perchlorate.

Study of the perfection of the internal architecture of  $\text{NH}_4\text{Cl}$ , alum, and  $\text{NaClO}_3$ .

Design and construction of an Analogue Computer for X-Ray crystal structure Analysis.

### X-RAY CRYSTALOGRAPHY

Precise determination of the ionic dimension of the structure of  $\text{KMnO}_4$ , and  $\text{KClO}_4$ .

X-ray diffraction studies on pyridine-formic acid, pyridine-acetic acid and pyridine-propionic acid.

Determination of structure of phenyl hydrazine by X-ray method.

### MAGNETISM

Measurement of the optical and magneto-optic constants of aqueous solutions of  $\text{HNO}_3$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{HClO}_4$  and  $\text{H}_3\text{PO}_4$  and some of their salts at different concentrations.

### THERMAL EXPANSION

Measurement of thermal expansion characteristics of two cubic crystals viz. potassium and ammonium alums and silver chloride over a range of temperature ( $0^\circ\text{C}$  to  $-170^\circ\text{C}$ ) employing the interferometric method.

Investigations on the thermal expansion of three isomorphous crystals viz. those of nitrates of lead, strontium and barium.

Thermal expansion of calcite and alkali halides.

### DIELECTRIC STUDY

Measurement of dielectric constants, densities and refractive indices of six heterocyclic polar liquids of the pyran and furan groups and the calculation of the moment values using the equations of Onsager-Bottcher, Syrkin and Buckingham.

Determination of dipole moments of Phthalic, and -naphtholic acids in diozone. Schenkel's correlation of the moment of an aromatic carboxylic acid with the  $\pi$ -electron density distribution of the parent hydrocarbon and the relation between the moment values of isomeric acids and their dissociation constants have been examined.

Study of the temperature dependence of the dielectric constant of diamond.

Study of the temperature dependence of the dielectric constant of ionic crystals.

## RADIOACTIVITY, ULTRASONIC ETC.

- Measurement of ultra-sonic velocities and their variation with concentration and at different temperatures for solutions of cadmium chloride, cadmium iodide, cadmium bromide and zinc iodide.
- Study in the compressibilities of binary mixtures near critical solution temperatures.
- Measurement of ultrasonic velocities and their variation with concentration upto 1 molar for solutions of strontium iodide, lead acetate, uranyl chloride and uranyl nitrate for the temperature range 25°C — 60°C.
- Determination of geology time by methods based on radio activity and allied problems.
- $K^{40}/A^{40}$  method of geochronology of potassium minerals.

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## **NATIONAL METALLURGICAL LABORATORY, JAMSHEDPUR**

**Nickel-free austenitic chromium—Nitrogen—Manganese—Copper—Stainless steels :** Research and development work on nickel-free austenitic stainless steel based on chromium, nitrogen, manganese and copper, has made significant progress. These substitute stainless steels have been made fully austenitic and non-ferro-magnetic despite their being wholly nickel-free, by virtue of their high optimum nitrogen content. The structural, physical and corrosion resistance properties of these stainless steels in different media have been comprehensively investigated.

**Beneficiation of low-grade Manganese, Chromite and other Ores :** Work has been done on the beneficiation of low-grade manganese ores on all-India basis, particularly on the amenability of low-grade ores to various beneficiation methods, and processes have been evolved whereby the Manganese content could be increased to 48% and above, thus making them suitable for ferro-manganese manufacture. A monograph embodying the results of this extensive work carried out by the laboratory giving full statistical data on the production and export of manganese ores in India is under publication.

**Beneficiation studies have also been carried out on :**

1. Chromite Ores of Mysore, Orissa and Bihar.
2. Graphite from indigenous wolfram from Rajasthan.
3. Cassiterite from Bihar.
4. Pyrite and Sulphur from Mysore, Bombay and Bihar.
5. Vermiculite from Mysore and West Bengal.
6. Kyanite from Mysore and gypsum from Rajasthan.

**Sintering of iron ore fines :** A detailed study on the sintering characteristics of iron ores of Rajharapahar, Madhya Pradesh and other raw materials to be used in the Bhilai Steel Plant.

**Electrolytic Manganese :** Production of electrolytic manganese metal of 99.95% purity from low-grade manganese ores.

**Electrolytic Manganese Dioxide :** High purity electrolytic manganese dioxide suitable for use in dry cells has been successfully prepared.

**Development work on Refractories :** A number of refractory minerals like, sillimanite, magnesite, bauxite, etc., were investigated for the production of suitable refractory materials.

**Graphite Crucibles :** Work has been in progress on both clay bonded as well as carbon bonded graphite crucibles. Processes for this manufacture have now been successfully worked out and crucibles of commercial size have been made.

**Assessment of indigenous foundry moulding materials :** A long term project was initiated on the assessment of moulding characteristics of various Indian foundry sands and bonding materials, for their

suitability in iron, steel and non-ferrous foundries. The data have been made available to all foundries in India.

**Production of oxygen-blown steel from Indian Pig Iron (L-D Process) :** Refined steel has been produced from Indian pig iron by high pressure oxygen injection techniques in a specially designed converter similar to that of the well known L-D converter.

**Low-shaft furnace project :** A 15-tons per day pilot. Low-shaft Furnace Plant is being installed primarily to investigate the possibilities of obtaining commercial grades of pig iron from fine grained or soft haematite iron ores or other low-grade iron ores and non-coking high ash coals, coke breeze or other solid fuels like carbonised lignite.

**Aluminising of Steel :** Aluminising of steel by hot-dip method utilising halide, organic and aqueous fluxes has successfully been developed on a laboratory scale.

**New plating techniques :** New plating techniques for plating metals like Ni, Cr on Al and also on non-metals including brass from non-cyanide baths have been developed.

**Liquid Gold :** A process has been developed for the production of liquid gold comparing favourably with the imported variety.

**Pilot Plant Projects :**

1. Production of electrolytic manganese metal.
2. Production of electrolytic manganese dioxide.
3. Concentration of manganese ores high in iron.
4. Chemical polishing of aluminium.
5. Hot-dip aluminising of steel wire and steel sheet.
6. Thermal beneficiation of low-grade manganese and chromite ores.
7. Treatment of low-grade manganese, chrome and other Indian ores by ore-dressing methods.
8. Pilot Plant production of refractories.
9. Production of iron in pilot low-shaft furnace.

**Symposia :**

1. Electroplating and Metal finishing.
2. Industrial failure of Engineering Metals and Alloys.
3. Non-ferrous Metal Industry in India.
4. Recent Trends in the Field of Production, Practice and Research on Refractories used in Metal industries.
5. Production, Properties and Applications of Alloy and Special Steels.
6. Mineral Beneficiation and Extractive Metallurgical Techniques.
7. Recent Developments in Foundry Technology.

# NATIONAL PHYSICAL LABORATORY

## PHYSICS

### Ph. D.

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